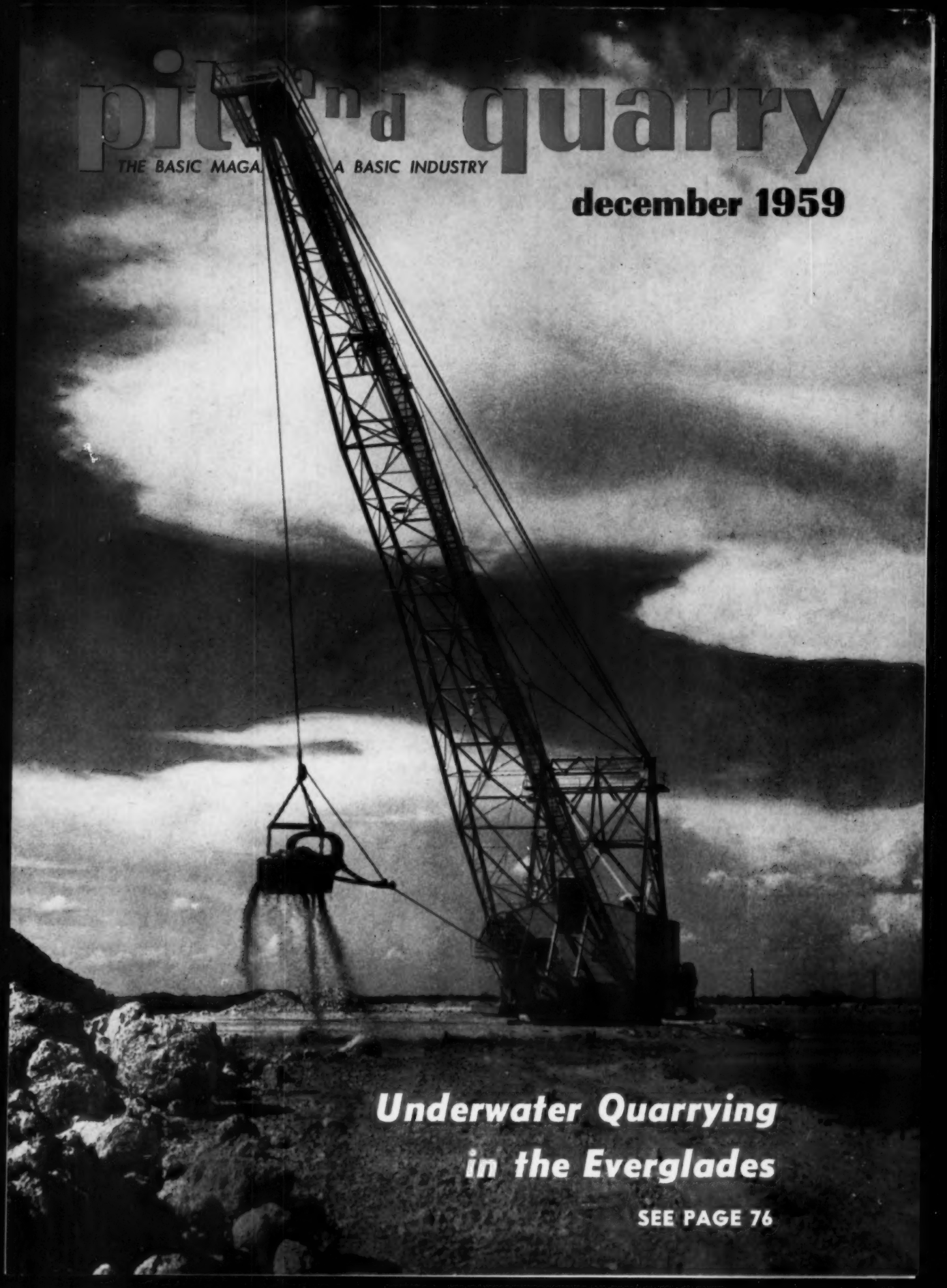
pit and quarry
THE BASIC MAGA A BASIC INDUSTRY
december 1959



Underwater Quarrying in the Everglades

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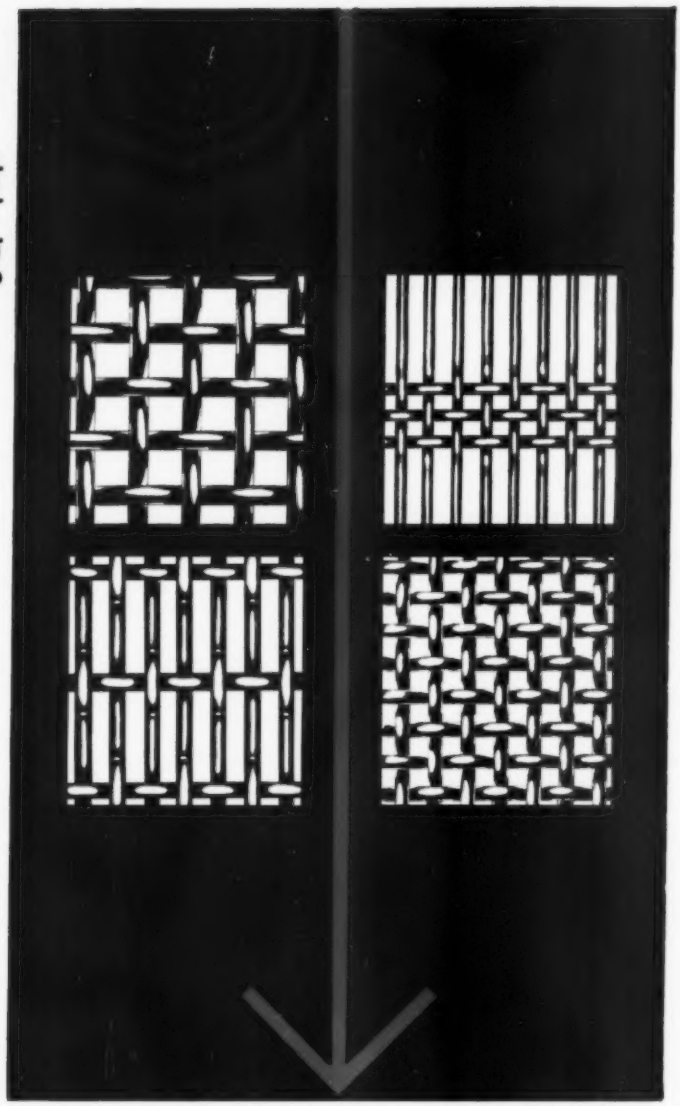
Lower Cost Screening



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Woven from any steel or any other metal that can be drawn into wire

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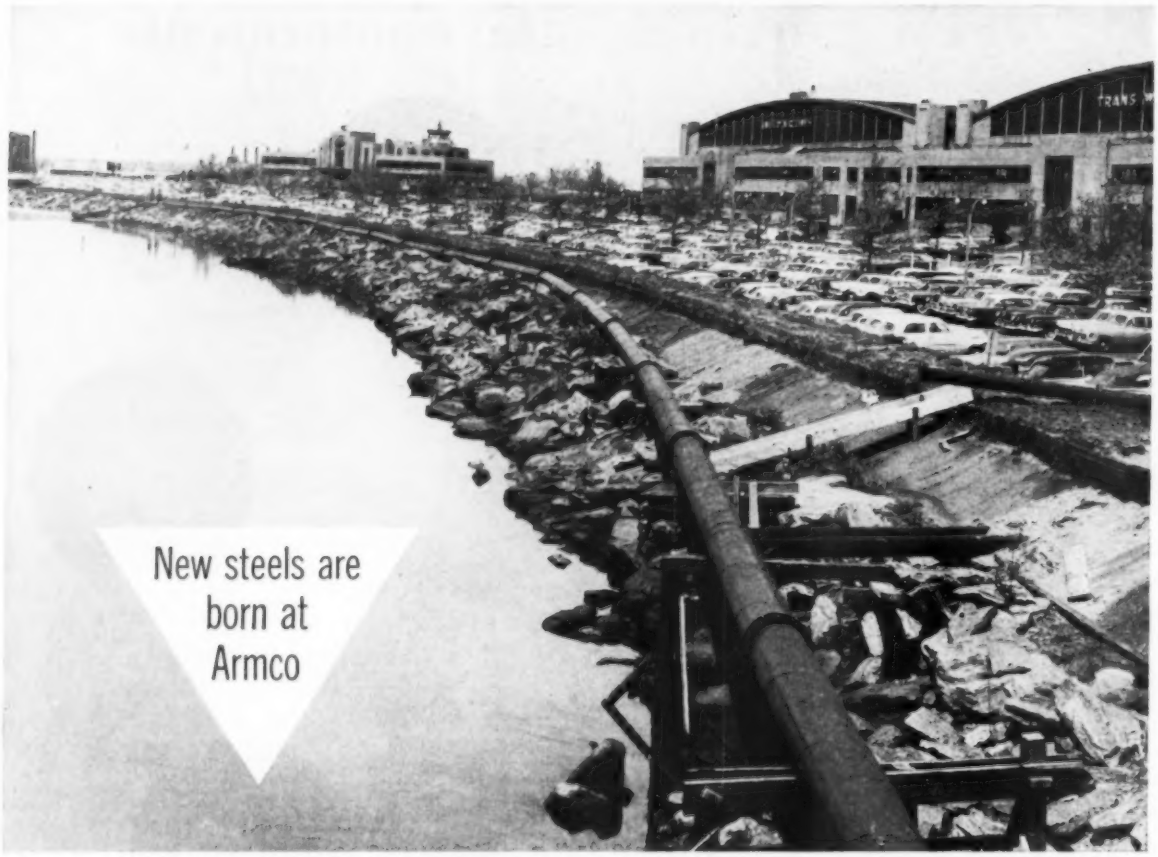
How Armco Pipe helped La Guardia Airport "Grow" 15 acres



New York City's La Guardia Airport is getting a new 15-acre parking lot where a boat basin used to be. A two-mile line of Armco Special Analysis Steel Pipe brought sand fill from an offshore dredge to fill in the 10-foot-deep basin. Pontoon floats and timber supports carried about one mile of the line from the dredge to the shore, with another mile running overland to the fill area. The project is part of a $35 million, 6-year improvement program.

For all hydraulic materials handling jobs, you will find that Armco Special Analysis Pipe offers many advantages. The extra abrasion resistance of Armco Pipe means lower costs per yard of material carried. Write us for more details. Armco Drainage & Metal Products, Inc., 5399 Curtis Street, Middletown, Ohio.

Offshore portion of the 20-inch diameter Armco Pipe delivering sand fill to expand La Guardia Airport.

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PIT and QUARRY

DECEMBER 1959
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READERSHIP Eastman RESEARCH

NBP

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

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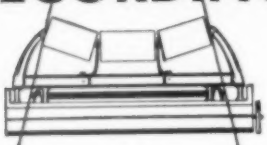
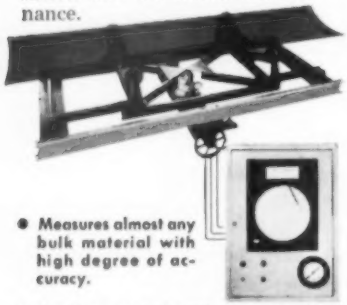
✓ *Indicates a* PIT AND QUARRY *staff-written on-the-spot report.*

CONTINUOUS
BELT
WEIGHING
AND
RECORDING



with
Con-O-Weigh

The Con-O-Weigh System offers an entirely new concept in continuous-belt-conveyor weighing — thoroughly job-proven as a control system in industries with problems in feeding, weighing, blending and totalizing of free flowing bulk materials. Consisting of only three major parts — the weigh section, load cell and recording-totalizing unit — Con-O-Weigh features rugged construction and simplicity of design, insuring economical installation and minimum maintenance.



- Measures almost any bulk material with high degree of accuracy.
- No obstruction above belt . . . complete weigh mechanism placed under the belt.
- Design prevents inaccurate torsional pressures, thus eliminating errors resulting from uneven belt loading.

For your specific bulk material weighing problem get the facts on this easy to install machine.

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Specialists in instrumentation, control and automation for milling and smelting. Consulting, engineering, design and installation services for all types of system controls.

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pit and quarry

To our many

thousands of

readers in all

parts of the world—

From the staff

of Pit and Quarry—

A Joyous Yuletide

and a Most Happy

New Year

Enter 5 on card, page 167 ➔

OUTPUT
in digging that beats an ordinary rig to pieces!

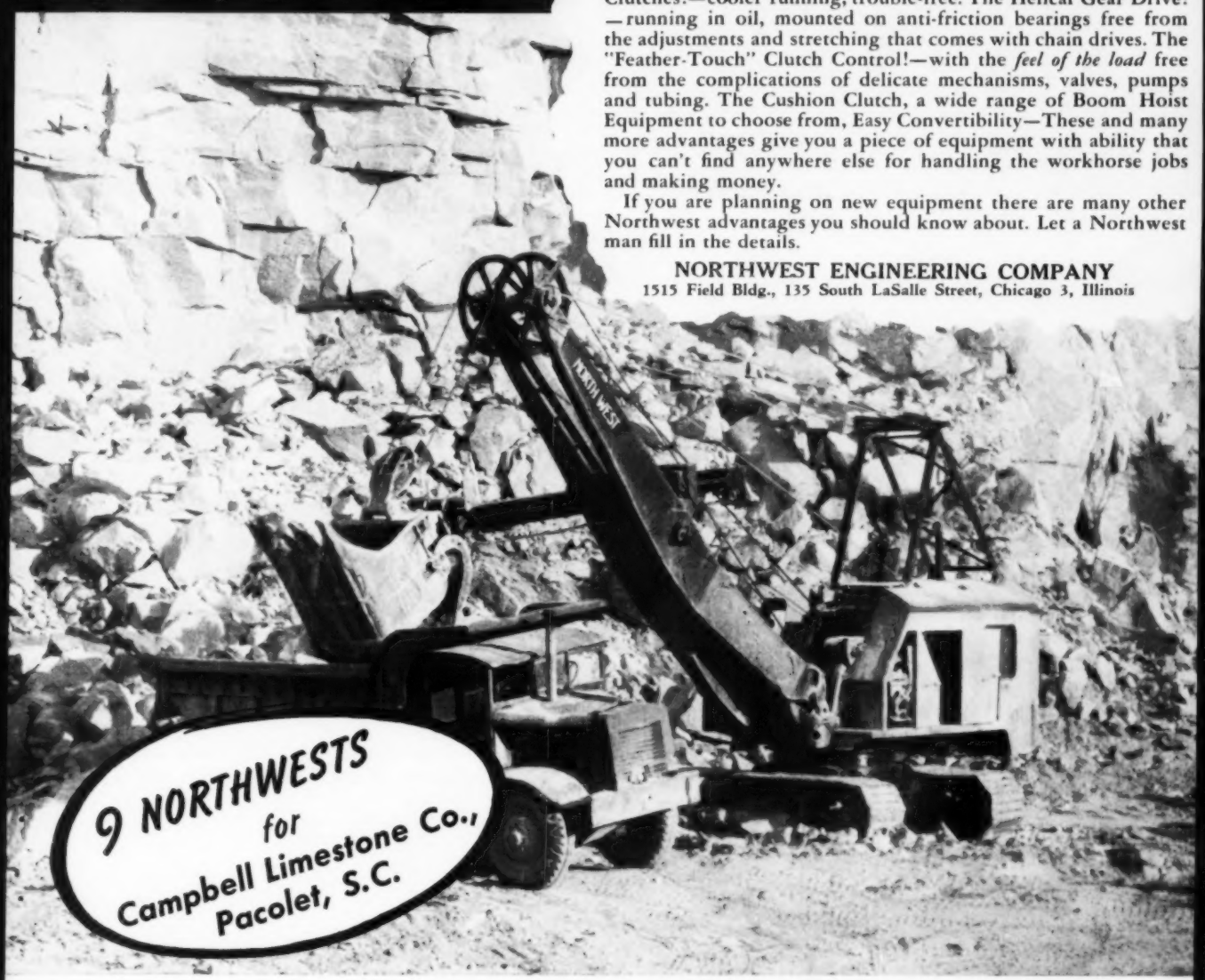
BUILT AS A ROCK SHOVEL, it gives you the performance you expect of a *Rock Shovel.* This big 80-D Northwest is one of eight bought by Campbell Limestone Co., and it is loading out the tough stuff they dig at Pacolet, S.C. This is the kind of brutal digging that beats ordinary equipment to pieces. M.W. Carter, Superintendent at Pacolet, says, "Most satisfactory service. The 80-D averages over 300 tons an hour."

Northwests are built for Rock Work. Machinery Bases are rugged, heat treated alloy steel castings with cast machinery side frames. Realize what this means. It assures a lifetime of permanence of shaft alignment. It eliminates weaving that is the direct cause of wear. There is nothing else like it.

You can go through the whole machine—Booms!—Sturdier for workhorse digging and lifting. Uniform Pressure Swing Clutches!—cooler running, trouble-free. The Helical Gear Drive!—running in oil, mounted on anti-friction bearings free from the adjustments and stretching that comes with chain drives. The "Feather-Touch" Clutch Control!—with the *feel of the load* free from the complications of delicate mechanisms, valves, pumps and tubing. The Cushion Clutch, a wide range of Boom Hoist Equipment to choose from, Easy Convertibility—These and many more advantages give you a piece of equipment with ability that you can't find anywhere else for handling the workhorse jobs and making money.

If you are planning on new equipment there are many other Northwest advantages you should know about. Let a Northwest man fill in the details.

NORTHWEST ENGINEERING COMPANY
1515 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois



NORTHWEST Always Ready to GO

S-80-93-S

NORTHWEST EQUIPMENT IS BUILT IN THE FOLLOWING SIZES

SHOVELS	CRANES	DRAGLINES	PULLSHOVELS	TRUCK CRANES
¾ Yd. to 2½ Yd. Capacity	13-Ton to 60-Ton Capacity	¾ to 3 Yd. Capacity	¾ Yd. to 2½ Yd. Capacity	25-Ton and 35-Ton Capacity

NEW CAT DW20 4-wheel, 345 HP Series G Tractor with 24 cu. yd. No. 482 Scraper

NEW CAT DW21 2-wheel, 345 HP Series G Tractor with 19.5 cu. yd. No. 470 Scraper

NEW CAT No. 619 2-wheel, 225 HP Series B Tractor with 14 cu. yd. No. 442 Scraper

BIG NEW CAT WHEEL RIGS CUT PRODUCTION COSTS

You name the job...these new Cat Wheel Tractors and matching LOWBOWL Scrapers can do it better with faster cycles and greater production, at lower cost. For example:

DW20-DW21 Series G Tractors and matching LOWBOWL Scrapers Now these big wheel tractors develop 345 HP—an increase of 8% over former units. Both tractors have 12% more rimpull than before—the DW20 develops 39,565 lb. (maximum) rimpull, and the DW21 has 49,100 lb. (maximum) rimpull. As a result, the new rigs travel faster (up to 20%) under similar haul road conditions. To accommodate this greater power and capacity, improvements have also been made in transmission and final drive.

Matching the increased horsepower and productivity of the Series G Wheel Tractors are the new No. 456 and No. 470 Series B LOWBOWL Scrapers. Rating is increased 8% to 19.5 cu. yd. struck and 27 cu. yd. heaped. (Rating on the No. 482 is 24 cu. yd. struck and 34 cu. yd. heaped.) Bowl, draft frame and apron are strengthened for greater resistance to tough materials and rugged loading—withstand higher loading stresses.

No. 619 Series B Wheel Tractor and No. 442 Series B LOWBOWL Scraper Here is the latest addition to the Caterpillar line of high-speed earthmoving equipment. This brand-new earthmover is a 14 cu. yd. struck (18 cu. yd. heaped) unit featuring ground-hugging roadability, "years ahead" service-accessibility, and high productivity. The No. 619 has a turbocharged 225 HP engine (and high torque rise), planetary final drives, unit construction, tubeless tires, a swing-away dash, 2-jack steering, and a dry-type air cleaner, providing the design and performance features that insure superior workability on a broad range of applications. All this in the new No. 619-No. 442 unit—plus proved economy over any earthmover of comparable size.

DW15 Series F Wheel Tractor and No. 428 LOWBOWL Scraper Greater strength and productivity in the well-known four-wheel DW15-No. 428. Bevel gear and pinion, differential and front wheel spindles offer increased service life. Machine delivers 200 HP. The big LOWBOWL Scraper handles 13 cu. yd. struck, 18 cu. yd. heaped. Can be unhitched to haul other units.

Plan your work around these new Cat Wheel Rigs for top production at lowest cost: The DW20-DW21 Series G, the new No. 619 and the DW15 Series F. The complete facts are at your Caterpillar Dealer. Call him today for a demonstration.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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BORN OF RESEARCH
PROVED IN THE FIELD

Enter 6 on card, page 167

"Our maintenance on the Deister Screen? *NIL!*"

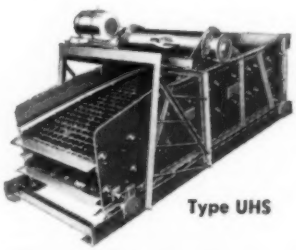
So says Joe Wittman, Plant Superintendent of Maybee Stone Company, Maybee, Michigan

From the time this highly efficient plant began operation in November, 1958, a Deister type UHS triple-deck 4' x 14' screen has processed every ton of high-grade limestone taken from the quarry pit. During this period, the Deister screen has operated 7 days a week—every week—and most of this operating time has been "around-the-clock."

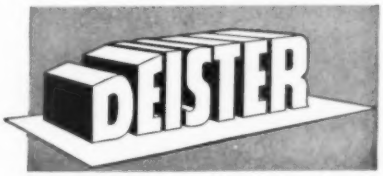
Joe Wittman is responsible for maintaining production and meeting specifications at Maybee—and he knows that the maintenance-free, high-output performance of the Deister screen is essential in keeping his production on schedule. He says, "I'd recommend Deister screens to any quarry operator. In nearly a year of operation, most of it 'around-the-clock,' maintenance on the screen has been absolutely nil. If there are better screens than this one, I'd like to see them!"

The Deister Type UHS Vibrating Screen provides high capacity and peak efficiency through the Exclusive Opposed Elliptical Throw Principle—assuring that actual and "on paper" capacities are equally high. The screen features a Life-Time Unitized vibrating mechanism, with two-bearing construction and oil mist lubrication. Also, exclusively Deister are the adjustable screen panels, enabling the operator to increase or decrease the screening angle at the feed or discharge end, independently of the balance of the screening area.

The dependability of Deister Screens is a matter of record with many aggregate producers who know from on-the-job experience that low maintenance costs help hold overall production costs to a minimum. Coupled with Deister's proven ability to produce material to exacting specifications, this means lower cost per ton of material produced.



Type UHS



DEISTER MACHINE COMPANY
1933 East Wayne Street, Fort Wayne 4, Ind.

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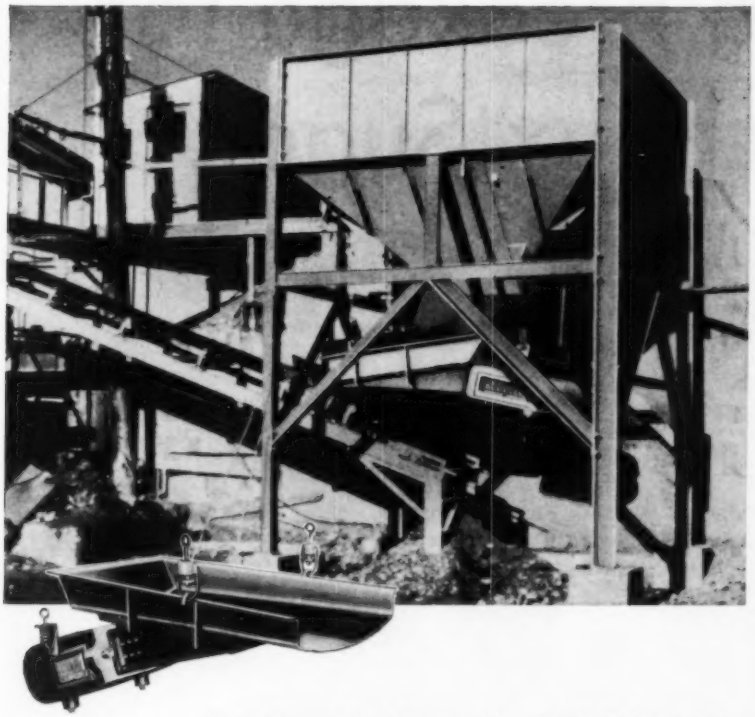
SYNTRON Vibra-Flow VIBRATORY FEEDERS



for dependable, controlled, high rate feeding of rock, aggregate and sand at low cost

SYNTRON Vibratory Feeders will feed rock, aggregate, sand and other bulk materials efficiently and economically at rates from pounds to thousands of tons per hour.

SYNTRON Vibratory Feeders give you features essential to high production at lower cost.

—dependable, even flow feeding, electromagnetic drive producing 3600 powerful vibrations per minute move even the most stubborn hard-to-handle material.

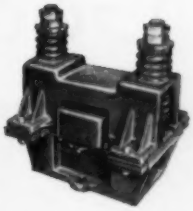
—flow control is easy, the power of vibration is instantly controllable and can be manual or automatic.

—durable and versatile. Withstand heavy load shock and wear by abrasion. Compact easily integrated into continuous operations.

—operation and maintenance economy. SYNTRON Feeders contain no mechanical wearing parts—require no lubrication or periodic adjustment.

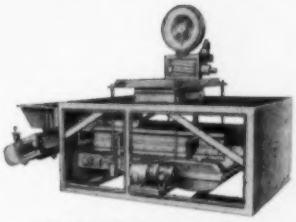
For dependable, low cost handling of your bulk materials problems, large or small, write for information on SYNTRON Electromagnetic Vibratory Feeders.

Other SYNTRON Equipment of proven dependable Quality



BIN VIBRATORS

VIBRATING SCREENS



GRAVIMETRIC FEEDERS

DRY FEEDER MACHINES

TEST SIEVE SHAKERS

SYNTRON COMPANY
385 Carson Ave. Homer City, Penna.

WONDERWALL™

cuts bag breakage for Godchaux Sugar

Another major concern, The National Sugar Refining Company's Reserve Division, producers of Godchaux brand sugar at Reserve, La., is now achieving substantial reduction in breakage with WONDERWALL bags.

WONDERWALL, developed by West Virginia, is the remarkable multiwall bag made with the new Kraftsman Clupak* paper. This paper's patented, built-in "stretch" gives it far greater toughness than ordinary kraft.

Mr. Sedgwick Howard, Division General Manager of National Sugar, states:

"Bag breakage has been cut by 51.8% in a series of shipments of more than 600 cars. The addition of an asphalt laminate sheet in our WONDERWALL bag has greatly reduced sugar hardening."

The extra toughness of WONDERWALL really pays off —and it doesn't cost you a cent more; in many cases it actually *reduces bag expense.*

See how WONDERWALLS can cut your bag breakage, and very possibly also reduce your bag cost. Just write Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Avenue, New York 17, N. Y., or 1400 Annunciation Street, New Orleans 13, La.

**Clupak Inc.'s trademark for extensible paper manufactured under its authority.*

West Virginia Pulp and Paper

Washington News Letter

By S. HERBERT UNTERBERGER

MANY Washington officials are planning to take a little extra time off during the Christmas holidays to rest up in preparation for the return of Congress early in January. For many reasons, this session is expected to be a very rough one.

First on the agenda this time—as in many past sessions—will be labor-management relations. Regardless of the status of the steel situation at that time, Congress will not be able to disregard the pressure to do something which will assure the nation that a similar debacle will not recur. Faith in the Taft-Hartley Act's emergency provisions is pretty well shattered. Congress will be expected to come up with something better and probably something stronger. Moreover, it will be expected to present a solution whose constitutionality is not seriously in doubt. This is a tall order.

With the decline in the effectiveness of their law, the authors of the Taft-Hartley Act are being blamed for lack of foresightedness. Actually, at least for Senator Taft, this charge is entirely unwarranted. It is perfectly clear, from a reading of his discussion of the emergency provisions of the law, that he had no confidence that those provisions would make it possible to settle every serious conflict before the public was seriously hurt.

As he visualized it, the steps prescribed in that law—fact-finding, 80-day injunction, further hearings, a vote on the employer's last offer—would be helpful in facilitating a settlement. But, if they were not successful, his law required that the injunction be dissolved and that the matter be referred to Congress.

Finally, it was his view that if the Taft-Hartley prescription did not work, it was the obligation of Congress to work out a better one. He anticipated just such a situation as we are now facing. And he expected Congress to face up to it.

Next on the agenda, as on the agenda of every Congress, will be the matter of the budget. When members of Congress went home, they were under the impression that the current 1959-60 budget had just about been balanced. It looked as though both receipts and expenditures would be about $79 billion, But, here again, the steel strike has thrown a monkeywrench into the works.

In that estimate of Congress it was assumed that, with returning prosperity, budget receipts would increase by $11,000,000,000—$5,-000,000,000 in corporate income taxes, $4,000,000,000 in individual income taxes and $2,000,000,000 in excise and other taxes.

A significant proportion of the increase in corporate income tax was expected to come from improvements in the profit situation in steel and related industries. It now appears that by the end of 1959, steel profits will be little (if any) higher than they were in 1958. They may even be lower.

In addition, the taxable profits of other, even non-related industries—for example, retail trade in steel making areas—will certainly be reduced below their expected levels. Similarly, a significant proportion of the increase in individual income taxes was expected to come from improvements in the incomes of many workers in the steel and related industries. The direct and derived effects of this prolonged strike has virtually destroyed this expectation.

Finally, the increase in excise taxes is in similar jeopardy since many of the products on which excise taxes are collected *e.g.*, automobiles, could not be made because of steel shortages.

On the other hand, there has been no change in government expenditures. The net result will almost certainly be another deficit year. This inevitably means further borrowing, thereby adding to the woes which the Federal Government is experiencing with its financing.

The last Congress refused to give the President the authority which he requested to increase the interest rate on long-term government bonds. As a result, these bonds continue to be unattractive investments, selling at substanital discounts. This fact makes it virtually impossible to float new long-term government bonds, thereby forcing the U. S. Treasury into the sale of short-term securities.

Recently, almost as an act of desperation, the Treasury issued some 5-year notes, the longest period which can be regarded as short-term, at the hitherto unprecedentedly high interest rate of 5 percent. The Treasury insisted that the condition of the money market was such that this high interest rate was required. The issue was tremendously oversubscribed, indicating that the interest rate may have been higher than was necessary.

Nevertheless, this situation had repercussions throughout the money market. If a perfectly riskless movement, such as a loan to the U. S. Government, pays 5 percent interest, then investments with some risk attached, such as mortgages, commercial loans, etc., must obtain a higher rate—and they are getting it.

It should not be surprising, therefore, if some committee of the next Congress decides to investigate this whole matter. It can also be ex-

(Continued on page 71)

These Special Excavating Jobs Are Best Handled by Sauerman DragScrapers

Deep Digging

900-FT. SPAN— 65 FT. BELOW WATER...

Load is deposited by tensioning the track cable, thus lifting the DragScraper from the pile. Tensioning continues to the desired height for releasing the DragScraper and returning it by gravity to the pit.

Operator controls digging and hauling from cab in head tower.

"the 10-yd. DragScraper is doing a wonderful job and we could not operate without it..."

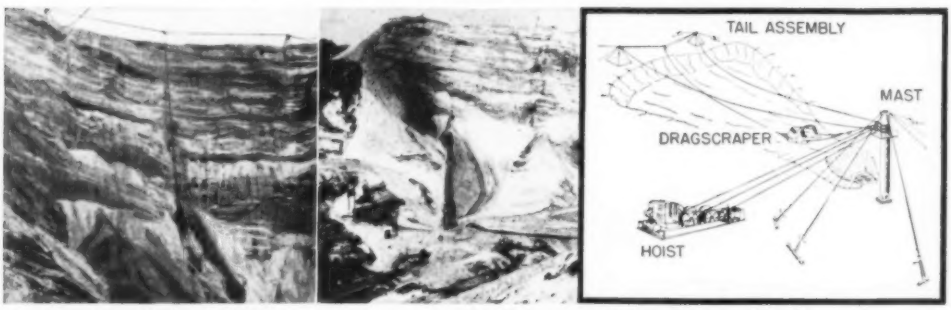
Louis Chinelli, Gen. Supt.
Redman Concrete Corp.

Redman had been trucking material at a cost of $35,000 a year to the location where the DragScraper is now placing it. The 10-yd. Sauerman covers a pond area of 1500′ by 3000′ and is digging 40 ft. deeper than their previous dragline could operate.

The DragScraper digs and hauls on a 900-ft. span. It operates between a 90-ft. fixed head tower and a 40-ft. mobile tail tower which may be shifted to change the line of operation. The company's 1000-yd.-per-day batch plants and its fleet of mixers and trucks are kept busy by the steady flow of material supplied by the DragScraper.

High Bank Digging

175 FT. HIGH— 600-FT. HAUL...



DragScraper digs from high bank.

Overall view shows height and steepness of bank. Diagram shows details of Sauerman installation.

"I have nothing but praise for our 4-yd. Sauerman Machine. Since the DragScraper began operations in 1952, we have worked it continuously 12 hours a day..."

John D. Robertson, Gen. Supt.
Chandler's Palos Verdes Sand & Gravel Co.

By working down from the top of the 175-ft. bank, the material flows ahead of the DragScraper. This provides bonus loads on each haul and substantially lessens the danger of cave-ins.

Operating cables are powered by a Sauerman three-drum electric hoist. Equipped for rapid shifting, the DragScraper can be quickly positioned to any line of operation between the two tail towers at the top of the bank and the headpost at the hopper.

The plant is the largest sand producer in the South Los Angeles area and, together with two ready-mix plants, keeps 22 ready-mix and 18 dump trucks busy.

The best Sauerman Machine for your plant is governed by the nature of the deposit, location of material, the depth and plant layout. Consult Sauerman engineers about your plant. Their recommendations will be based on fifty years of excavating machinery experience. Ask for Catalog A (DragScrapers). Sauerman News Nos. 149 and 150 describe the above installations in greater detail.

SAUERMAN BROS. INC. 634 SOUTH 28TH AVENUE • BELLWOOD, ILLINOIS

CRESCENT SCRAPERS • SLACKLINE and TAUTLINE CABLEWAYS • DUROLITE BLOCKS

Labor Developments

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

THE prolonged steel strike has proved that (1) no matter how hard they try, the President and the national administration can not avoid becoming involved in a serious labor dispute in a critical industry; and (2) that governmental machinery and legislation designed to prevent such disputes from developing into national crises—and to cope with them if they should develop—is seriously ineffectual.

It is apparent that the Federal Government could not stay out of the problem. Despite the President's popularity, his exhortation to the two sides to settle their differences might just as well have not been said, for all the effect it had on the disputants. Even when, in desperation, he appointed a so-called fact-finding board, which was obviously under orders to use fully the mediation and conciliation techniques in which its members were highly skilled, this turned out to be a futile act. No more eloquent statement of that futility can be found than that expressed in the closing paragraph of the Board's report to the President:

"As we submit this report, the parties have failed to reach agreement, and we see no prospects for an early cessation of the strike. The board cannot point to any single issue of any consequence whatsoever upon which the parties are in agreement."

Certainly, this total failure cannot be attributed to the lack of collective bargaining know-how and ability. The negotiators are probably the most skillful and knowledgeable bargainers in the country. Failure to reach agreement is more likely to be attributable to the fact that the parties knew too much about each other and their situations than that they knew too little.

Nor did even the most profound appeals to their loyalty, patriotism, or even long-range self-interest appear to have any effect. Considering the global competition in which we are engaged with the Soviet Union, the possibility that our most basic industry can be paralyzed for many continuous months is manifestly a serious weakness. It was probably too much to expect that the strike which had barely begun would be settled just because the country was on exhibition before the powerful leader of that competition. But months later, when both parties would be expected to be nearing their exhaustion points, similar appeals were equally unavailing.

Similarly, both parties were thoroughly aware that failure to settle reasonably promptly could have no other consequence than to encourage or even demand congressional action. The unions had just come through a defeat on the recently enacted Landrum-Griffin bill, and their leaders knew that the votes were there to pass legislation which, in their view, was even more repressive.

The steel company heads knew well that the passage of legislation whereby wages would be governmentally decided would be accompanied (or shortly followed) by similarly restrictive price control legislation.

Indeed, the forerunner of such legislation, a bill which would require steel companies to register price changes before they are made, had been introduced and had received serious consideration in some quarters. Nevertheless, in the tradition of Greek tragedy, they both acted to advance from crisis to more serious crisis.

Now, not only the government in Washington, but also the rest of the country appears to be fully convinced that the steel companies and the unions can not be relied on to settle their differences before the nation is precipitated into a crisis, and also that no similar steel strike can ever be permitted to recur. However, the way to prevent another such strike remains an unsolved question.

Some relevant suggestions were made in a Massachusetts law attributed to the late Professor Sumner Slichter of Harvard University. This law, which is known by his name, provides the governor with a variety of techniques. He is not required to use any of them, but he may choose to use any one (or more) of them if and when he decides to do so. He can:

1. Institute an investigation including a public hearing over which he or a commissioner of safety or of labor and industry may preside.

2. Cause the parties to appear before a moderator to explain why they will not submit the dispute to arbitration. The moderator may try to mediate the dispute, and he may file a fact-finding report. During this step the parties must continue to operate under the old terms and conditions.

3. Request the parties to submit the case to arbitration. During this step, also, they must continue to operate under the old terms and conditions.

4. Declare an emergency during which he may seize and operate the properties either on a partial or total basis under the old terms and conditions while a three-man arbitration board makes recommendations. The

(Continued on page 71)

HEAPS IN A HURRY — cuts minutes from the miles . . . That's why the Curtiss-Wright CW-215 moves the most dirt — makes the most profit for contractors like R. C. Wetherall, shown here working on a West Virginia road job . . . This hustling pair of 215s consistently pack in heaping loads of clay, shale and rock — and really keep the pusher operator hopping to keep up with their fast cycles.

UNUSUAL MACHINE? Not really! You'll find the same high performance in the entire CW line — from the 7 cu. yd. CW-27 to the big CW-226, largest two axle scraper on the market. Check any model against your job requirements . . . put "Yards Ahead" performance to work for you.

AD NO. 52-46

CURTISS-WRIGHT MODEL

215

CW-215 SELF-PROPELLED SCRAPER
Capacities: 15 cu. yds. struck, 21 cu. yds. heaped, 42,000 pound rated load

SALES • SERVICE • PARTS
at your
CURTISS-WRIGHT DISTRIBUTOR

SOUTH BEND DIV. CURTISS-WRIGHT CORPORATION, SOUTH BEND, INDIANA

SOUTH BEND DIVISION
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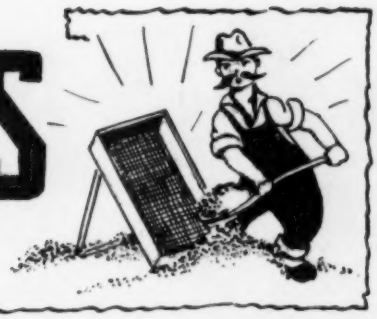
CORPORATION
SOUTH BEND, INDIANA

SCREENINGS



By RAY L. SMITH JR.

WITH the new year around the corner, bedraggled football coaches, has-been baseball managers and a few less prudent newspapers drag out hazy crystal balls for a look at the future.

The coaches and managers look forward with optimism for better things—while the newspapers take a turn at prognostication on political hopefuls.

Last week one of the Florida papers cast its vote for Lyndon Johnson as the next president, describing the Texan as a big man from a big state to do a big job, or some such dribble.

Late in 1957 one of the country's better newspaper executives came up with a forecast that would put George Gallup and the sports figures to shame. The man said things would be again deadlocked for a suitable candidate for the White House. He further predicted that the compromise candidate would be Stuart Symington of Missouri.

Don't bet the grocery money on such a long-shot but this is one prediction which will bear watching.

Dead Gravel

"WRITE Me a Poem, Baby," the best seller of yesteryear by H. Allen Smith, is a montage of sayings by kids as learned from their parents and teachers.

Children, claims Smith, never mince or waste words in their literary efforts. His examples bear out the theory,

Novelist Jean Stafford, at six, wrote an ode to gravel:

"Gravel, gravel on the ground,
Lying there so sad and sound,
Why is it you look so dead?"

The downfall of Rome has been theorized by many a scholar. The reasons usually given are many and varied. A nine-year-old, perhaps, had the best reasoning for Rome's decay:

"The downfall of Rome was caused by carelessness."

Smith's authors prefer the short story. Wrote a Hollywood producer's daughter:

"Once upon a time there was a poor family. The mother was poor. The daddy was poor. The children were poor. The butler was poor. The chauffer was poor. The maid was poor. The gardener was poor. Everybody was poor."

Think your child can better those of H. Allen Smith's? If so, we'd like to print their efforts. Any takers?

Potpourri and Succotash

Forty years ago it took only 100 horsepower to keep a combat airplane in the air. Today it takes 250 horsepower to carry a 115-pound female to the corner grocery.

A designer claims women dress to express themselves. Some gals have little to say!

The newer cars have wider seats and so do we.

Then there was the moron who thought steel wool was like the fleece from a hydraulic ram.

Did you hear about the little moron who thought a mushroom was a place to neck?

Gossip is what no one claims to like, but everyone enjoys.

A woman tourist posed for a snap shot in front of the fallen pillars of an ancient temple in Greece. Don't get the car in the picture." she warned, "or my husband will think I ran into the place."

"He's a guy who thinks if he hadn't been born, people would want to know why."

This conversation was recently overheard in a small neighborhood bar:

"Bartender, give me a dry Martinus."

"Sir, don't you mean Martini?"

"Listen, bartender, if I want more than one I'll tell you."

We have always been fond of the letter written by an author to a typewriter company when he found that the letter 'E' was missing from his new typewriter on delivery. He sat down immediately to type this indignant letter:

Gxntlxmxn: I havx just rxcxivxd my nxw typxwritxr by Railway Xxprxss, and I am forcxd to advisx you that onx of thx most important lxttxrs of thx alphabxt is missing, and I must dxmand your immdiatx attxntion. Thx lxttxr I rxfxr to is the lxttxr "X", and by that I mxan thx fifth lxttxr in thx alphabxt: "X". It is hard for mx to xxplain this on this machinx, but I'm surx you must undxrstand what I mxan. Plxasx givx this your prompt attxntion, as I dxpxnd on thx typxwritxr for my livxlihood.

Sincxrxly,

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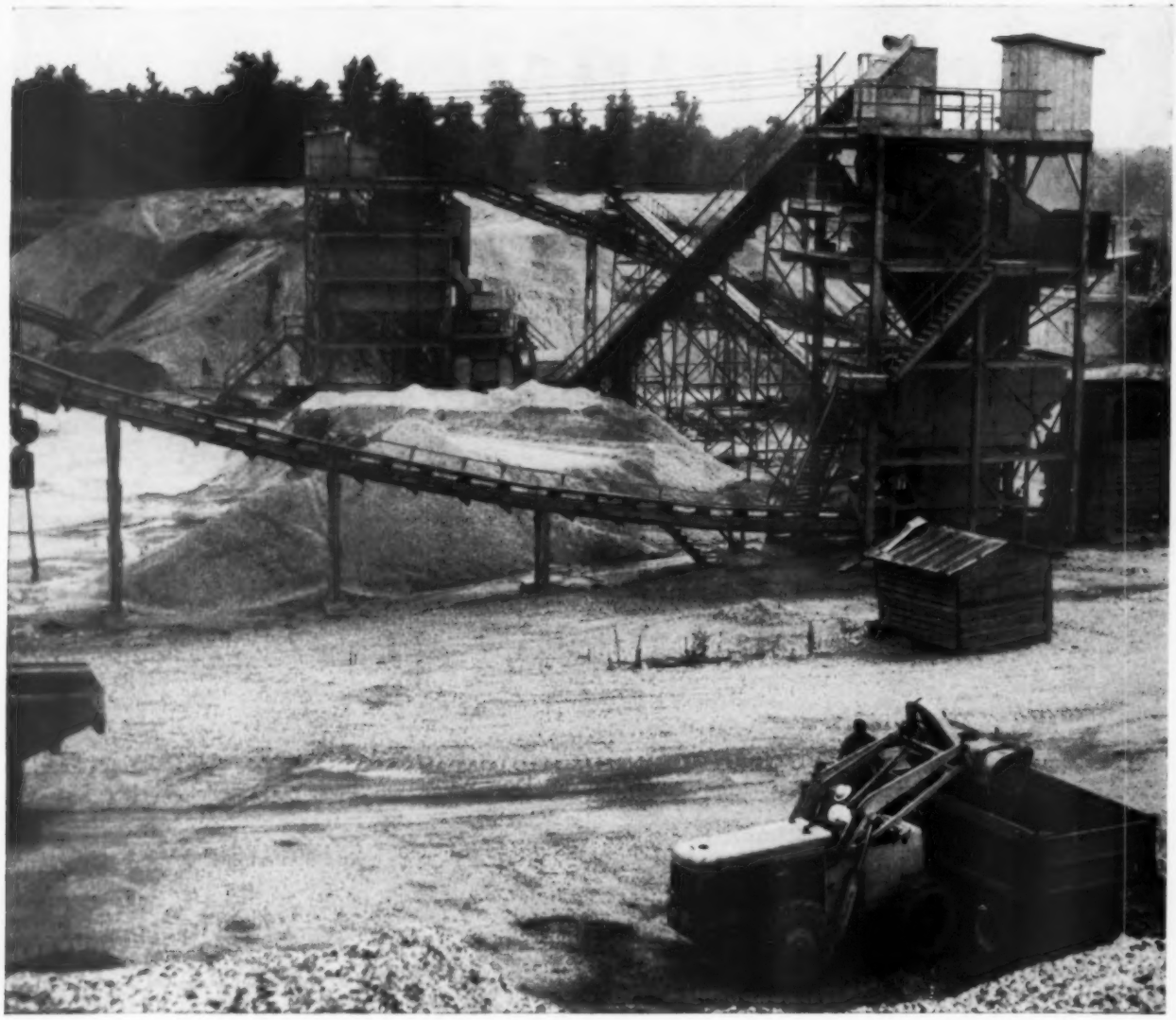


Protection with Gulf products pays off in maintenance

GULF MAKES THINGS

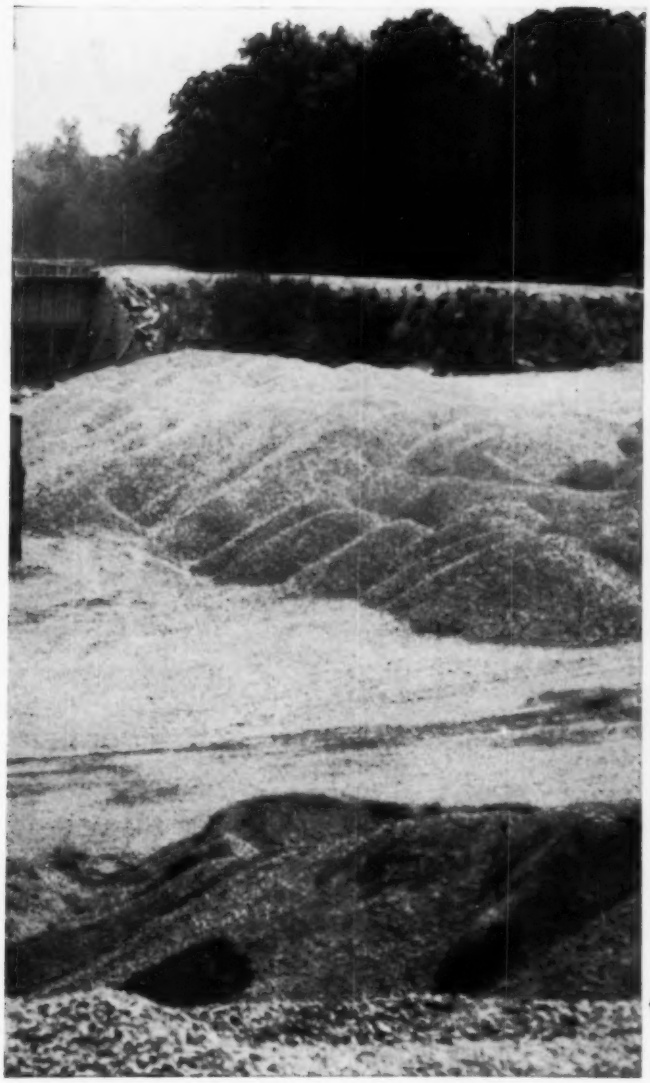
At its new Pomona Quarry near Guilford College, N.C., Superior Stone Co. has about $300,000 worth of heavy equipment including a bulldozer, air compressor, power shovels, crushers, the usual assortment of towers and conveyor belts—and 4 brand new Euclid dump trucks.

"I'm especially interested in the maintenance of the Eucs, because they're new, and because they do such brutal work," said Mr. Williams, Pomona Quarry Superintendent. "They carry about 23 tons of granite, up a 35% grade about every 15 minutes, 7½ hours a day. And they work in clouds of fine granite dust that even gets past a good filter."

So, with special emphasis on the Eucs, Gulf made a comprehensive survey of all equipment. A consolidated fuel and lubrication chart was drawn up, reducing the number of fuels, oils and greases required—in line with manufacturers' specifications. This not only insured proper fueling and lubrication, it also simplified purchasing and stockpiling.

For the hard-working Euc engines, Gulf recommended high-detergency Gulflube Motor Oil X.H.D. and Gulf Dieselect—a fuel especially formulated for heavy duty diesel engine service.

After 15 months of tough service, and 2,100 hours of operation, the Euclid truck engines were examined by Mr. Williams. "Everything was clean," he said. "Almost no engine deposits. Only a minimum of sludge. Exhaust ports not clogged up. The program recommended by Gulf is paying off in every respect. It's helping us amortize our expensive equipment."



Up, over and into the hopper go some 20 tons of granite, being unloaded here by one of the hard-working Eucs at Pomona Quarry. Engines showed no harmful deposits after 2100 hours on Gulf Dieselect fuel and Gulflube Motor Oil X.H.D.

Pomona Quarry of Superior Stone, near Guilford College, N. C. Superior Stone, headquartered in Raleigh, N. C., works a number of quarries in both Carolinas and Georgia. All powered equipment operates on Gulf fuels and lubricants.

savings at new quarry . . .

RUN BETTER!

How's *your* equipment doing—on maintenance and performance? See how Gulf makes things run better. Just call a Gulf Sales Engineer at your nearest Gulf office. Meanwhile, write for 88-page "Contractors' Guide"—the maintenance "bible" for heavy equipment.

GULF OIL CORPORATION
Dept. DM, Gulf Building,
Pittsburgh 30, Pa.

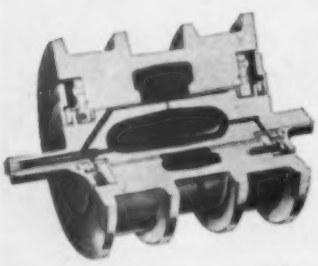
GULF

Marion Williams, left, Superintendent of Superior Stone's Pomona Quarry, discusses his fuel and oil preventive maintenance program with Julian Lanier, Gulf Sales Engineer.

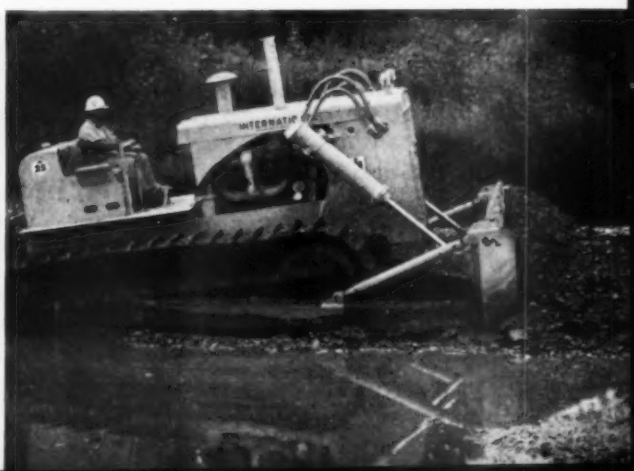
TD-25 power-steering plus

team new 230 diesel hp, new traction.

You "gain ground" on all four steps of the push-loading cycle with the torque-converter TD-25. (1) you slow-down by power-shifting down and using decelerator to get feather-touch contact; (2) power-shift either track up or down to maintain solid pusher contact on curves; (3) get gear-higher kick-outs with on-the-go power-shifting; (4) reposition faster, with higher-than-ordinary reverse!



Dual-protected TD-25 Dura Rollers have precision-fitted, metal-to-metal cartridge-type sealing—to exclude abrasives and retain lubricant. These rollers have pressure relief passages so they can be power-lubricated—without affecting seal life or efficiency. Dura Rollers have king-size lube reservoirs, to make twice-a-year lubing practicall



on-the-go Hi-Lo power-shifting

...to outearn other rigs up to 50%!

You Power-Steer and Power-Shift the new International TD-25, with 2-finger ease! Exclusive, years-proved Planet Power steering gives you full-time "live-track" power and traction to make full-load turns and eliminate "dead-track drag." Hi-Lo on-the-go power shifting instantly matches power to conditions to prevent losing momentum!

Exclusive Efficiency-Range Control

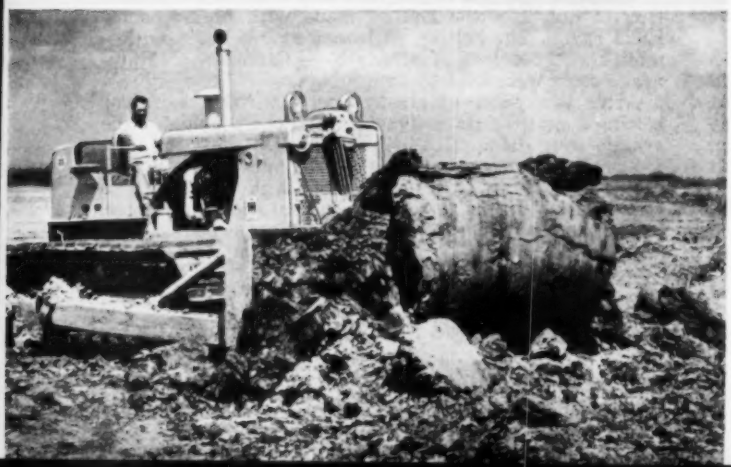
Exclusive International Hi-Lo power shifting makes the TD-25 the industry's only 4-speed torque-converter crawler, and the only one with load-matching, efficiency-range control. In the synchro-mesh transmission TD-25, the Hi-Lo planetary system gives eight speeds forward and reverse—with cycle-speeding up-or-down, on-the-go shifting!

You get big-capacity teamwork of 230 diesel horsepower with the new 7-roller tracks, platformed on super-rugged, double-box-beam frames—and carried on International's new minimum-maintenance Dura Rollers! Over 39 square feet of ground-gripping traction area harness the "25's" great power!

You simply press the direct-start button, to command the "25's" free-breathing diesel horsepower. Dual valving of the "25's" high-torque DT-817 engine provides for peak turbocharging efficiency—to deliver full-rated power from sea level to timberline!

Full performance is at your fingertips, full time. No wonder the TD-25 outearns same-sized clutch-steered crawlers up to 50%—on a wide range of tough jobs!

You don't spill the "pay" part of your load with the TD-25—even when you change speed making the "pass." Hi-Lo on-the-go planetary shifting keeps the blade fully loaded—even when dozing round curves, benching, or side-casting! See how the "25" can help you pocket bigger profits.



SIZE UP TD-25 PLANETARY DRIVE DESIGN that breaks the load-limiting, time-losing steering and shifting bottlenecks—which plague king-sized, clutch-steered crawlers.

COMPARE NEW TD-25 FULL-LOAD, FULL-TIME ABILITY, to outearn other same-sized rigs—up to 50%! Let your International Construction Equipment Distributor demonstrate!

International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

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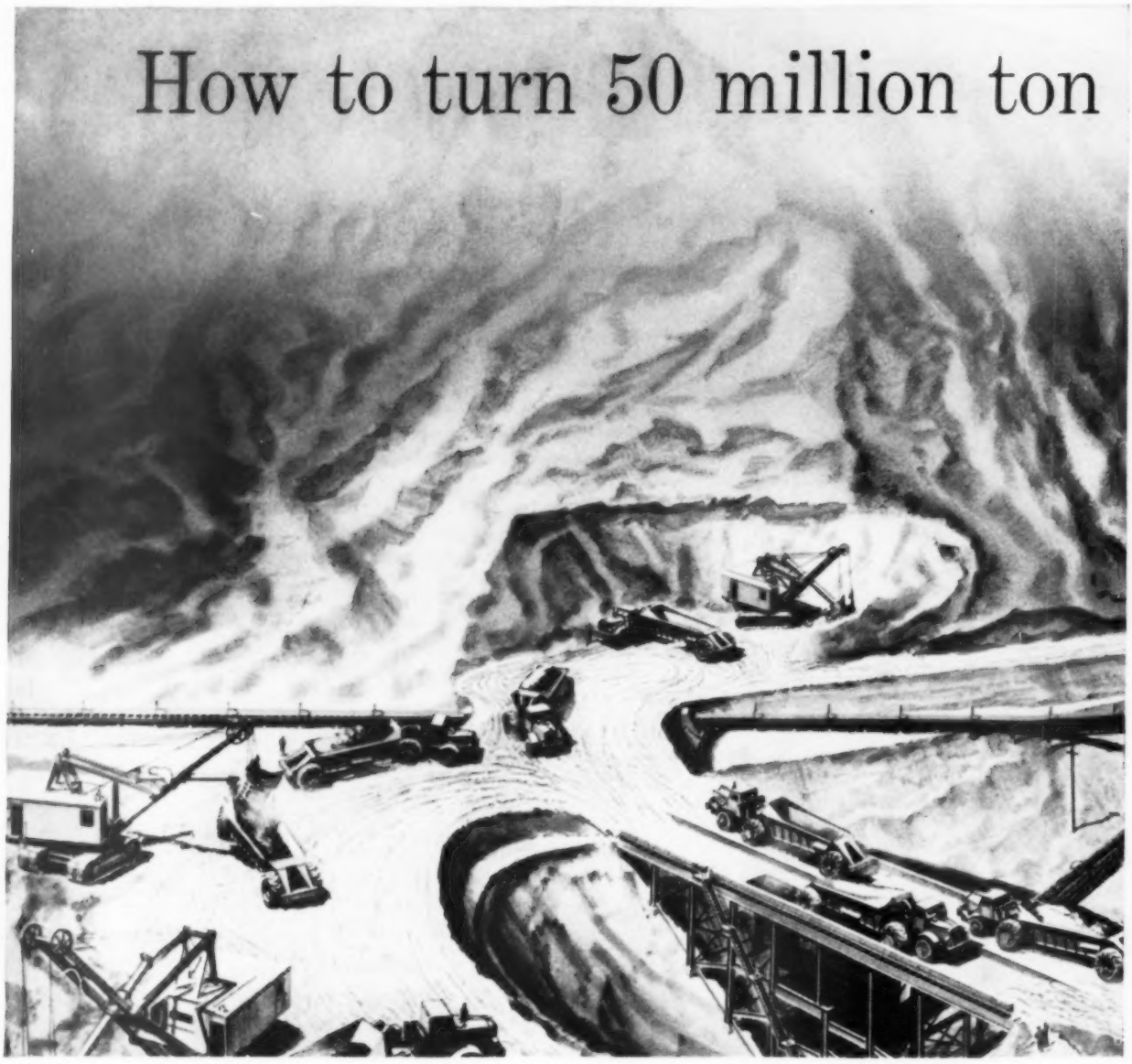
How to turn 50 million ton



HEWITT ROBINS CONVEYOR BELTING OF HIGH-TENACITY ENKA RAYON

Hewitt Robins conveyor belting of high-tenacity Enka rayon scores an engineering triumph on the Great Salt Lake project.

In 1956, Morrison-Knudsen began construction on a 13 mile embankment across the Great Salt Lake for the Southern Pacific Railroad. Hewitt Robins was awarded the bulk materials handling system to screen and move 50 million tons of gravel two miles from hillside to lakeside.

A giant conveyor belt system was set up at Great Salt Lake. This system used more than 23,000 feet of belting, designed to move 90,000 tons of gravel a day and travel at twice the speed of conventional belts.

To operate at this twenty-two hours per day schedule, Hewitt Robins chose belting made with high-tenacity Enka rayon. The belting withstood severe heat and humidity without loss of strength or flexibility. Maintenance costs were kept to a minimum.

After two years of steady operation, this conveyor belting completed its assignment and components of the system were dismantled and resold.

For the Great Salt Lake project and hundreds of others each year, Hewitt Robbins specifies high-tenacity Enka rayon. They know that Enka rayon makes stronger, longer-wearing, more economical conveyor belts.

American Enka Corporation • 530 Fifth Avenue, New York 36, N. Y. Leading producer of yarns

mountains into molehills

SCORES AN ENGINEERING TRIUMPH ON THE SALT LAKE CITY PROJECT

Pound for pound, Enka Rayon is your best value in industrial yarn

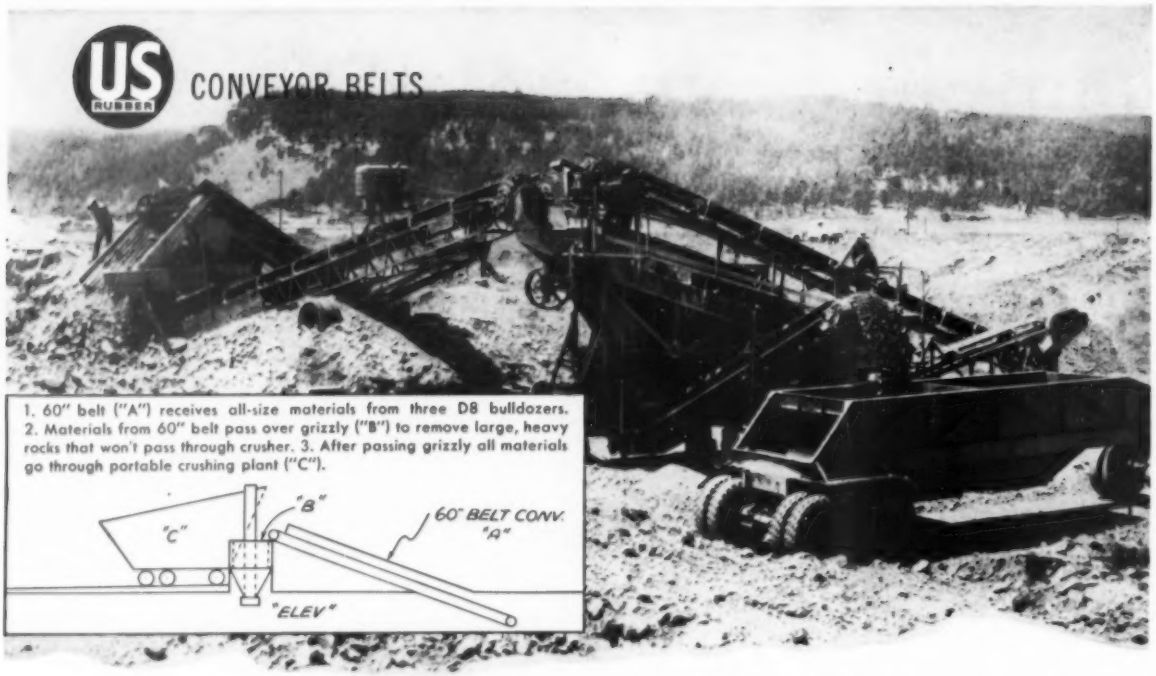
Specify Enka high-tenacity rayon yarns for industrial rubber products, chafer fabrics, heavy-duty sewing thread and many other vital end-use applications.

Greater strength • More elasticity • Increased heat and humidity resistance • Higher safety factor • More economy • Superior flexibility • Better shock absorbency • Longer service • Less maintenance.

Write for Hewitt Robins brochure on C/R conveyor belting of high-tenacity rayon and cotton. It gives technical data on strength and other characteristics of belting made with cotton-rayon fabric. Write Hewitt Robins, Stamford, Conn. Ask for bulletin 12-24A.

ENKA high-tenacity rayon for industry

and fibers for apparel, home and industry, and Tyrex® viscose tire yarn.


US RUBBER
CONVEYOR BELTS
1. 60" belt ("A") receives all-size materials from three D8 bulldozers. 2. Materials from 60" belt pass over grizzly ("B") to remove large, heavy rocks that won't pass through crusher. 3. After passing grizzly all materials go through portable crushing plant ("C").
"B"
"C"
60" BELT CONV. "A"
"ELEV"

Conveyor equipped with U.S. Matchless Belt increased production from 175 tons to 300 tons per hour

Such records as this have made U.S. Rubber the world's largest producer of conveyor belts.

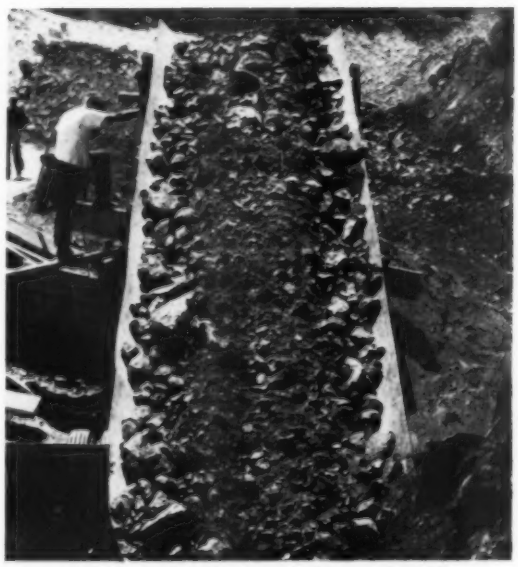
In this instance the "U.S." Belt helped increase production at the Carlson-Lien Company (Piedmont, S.D.), a supply firm currently producing road-building crushed rock and delivering it to highway projects. The belt is 60" wide, 35 feet from center to center (78 feet overall). "Our intention," says Bruce Lien, company secretary-treasurer, "is to replace all belts with U. S. Rubber Belts."

In this operation, bulldozers push the rocks to be processed into the loading point. The conveyor belt then carries this material to the grizzly. The belt was designed to withstand direct loading by bulldozers. The impact of the large rocks falling directly on the belt does not damage the conveyor system. This permits the grizzly to be placed at the discharge end of the conveyor instead of at the feed point as in conventional installations.

The superiority of this belt not only helped speed up and increase production, but also eliminated the need for three or four men to laboriously remove large rocks that would damage a belt of inferior quality. The "U. S." Belt proved so efficient in tons moved per hour that another bulldozer was added to keep the loading pit stocked with raw materials. "The belt will pay for itself on this one job. We recommend it to anyone," says Bruce Lien.

• • •

When you think of rubber, think of your "U.S." Distributor. He's your best on-the-spot source of technical aid, quick delivery and quality industrial rubber products.



Close-up of 60" U. S. Matchless® Belt carrying rocks from raw material pit up incline to crusher.

This installation was handled by "U.S." Distributor W. S. Nott, Minneapolis

US RUBBER

Mechanical Goods Division

United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

News of the Industry

Outlay of $30,000,000 Set by American-Marietta In Expansion Program

A $30,000,000 expansion program—the largest in the Chicago-based firm's history—has been approved by American Marietta Company. Seven new plants and enlargement or improvement of a number of the firm's research and production facilities are included in the program.

Over one-third of the allocation will be used to expand lime, magnesite, and dolomite production capacity by 180,000 tons annually. Expansion and extended automation at cement plants serving eastern and southeastern states are planned. Substantial investments are also expected to expand facilities for producing essential construction materials in anticipation of a record-breaking $55,000,000,000 construction year during 1960.

Production of basic aggregate materials will be upped by enlarging or modernizing quarries at five locations in the southeastern states, and new plants will be built to produce concrete pipe for highway and municipal sewer systems.

New kilns will be installed at Manistee, Mich., and Woodville, Ohio.

The program will be financed from retained earnings.

Cement Sub-Committee Of A.I.E.E. Plans Meeting At Milwaukee in May

The second technical conference of the Cement Industry Sub-Committee, American Institute of Electrical Engineers, will be held on May 17, 18, and 19, 1960, in Milwaukee.

This sub-committee was formed to stimulate and initiate engineering papers and discussions pertaining to electrical problems in the cement manufacturing industry; to aid in organizing technical sessions devoted to these problems at A.I.E.E. meetings; and to promote standards in the electrical engineering field for the cement industry.

Coming Events

January 18-21, 1960—Cincinnati, Ohio. 58th Annual Convention, American Road Builders Association. Netherland Hilton Hotel.

January 18-21, 1960—Washington, D.C. Board of Directors meeting and Annual Convention, National Limestone Institute, Inc. Statler-Hilton Hotel.

January 24-28, 1960—Chicago. Annual meeting, Associated Equipment Distributors. Conrad Hilton Hotel.

January 28-29, 1960—Roanoke, Va. Annual meeting, The Expanded Clay and Shale Association. Hotel Roanoke.

February 1-4, 1960 — Detroit. Fifth annual convention, National Bituminous Concrete Association, Inc. Sheraton-Cadillac Hotel.

February 1-5, 1960—Chicago. Committee Week, American Society for Testing Materials. Hotel Sherman.

February 15-19, 1960—Chicago. Combined biennial show, joint convention, National Sand and Gravel Association, and National Ready-Mixed Concrete Association. The Coliseum, and Conrad Hilton Hotel.

February 22-24, 1960—Chicago. 43rd Annual Convention, biennial manufacturers division exposition, National Crushed Stone Association. Conrad Hilton Hotel.

February 22-24 — Los Angeles. 40th Annual Convention, National Concrete Masonry Association. Hotel Statler.

March 14-17, 1960—New York City. 56th annual convention, American Concrete Institute. Commodore Hotel.

Future Construction Total For Sept. Down from '58 But Over August Mark

Contracts for future construction in the United States in September totaled $3,058,055,000, down 5 percent from the total for the same month last year, F. W. Dodge Corporation has reported. Notable gains in most nonresidential building categories were more than offset by a sharp decline in heavy engineering, while residential contracts were at about the same level as a year ago.

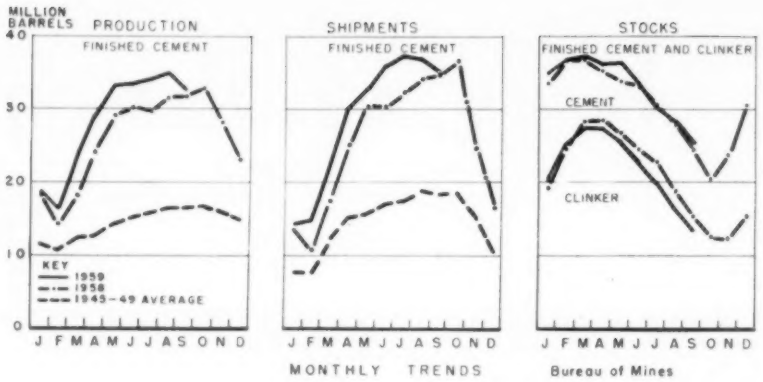
Dr. George Cline Smith, Dodge vice-president and economist, pointed out that although September marked the second consecutive month in which construction contracts fell below 1958 levels, the September, 1959, total was the second-largest ever recorded for that month. After allowance for normal seasonal patterns, the September figures actually showed some improvement over August, with the seasonally adjusted Dodge Index of construction contracts rising to 269 from a level of 258 in August.

Nonresidential building contracts in September amounted to $1,006,302,000, a gain of 13 percent over the September, 1958, figure. Every major nonresidential building type was up, with particularly sharp gains in manufacturing, commercial, and recreational buildings.

Contracts for residential buildings in September were valued at $1,465,957,000, about the same as a year ago. A modest gain in single-family houses was offset by a sharp drop in apartment building contracts. The number of dwelling units represented by the residential contracts in September totaled 111,494, down 3 percent from September, 1958.

September contracts for heavy engineering construction amounted to $585,796,000, a decrease of 32 percent from September, 1958.

Cumulative totals of contracts for the first nine months of 1959, with percentage changes from the comparable period of last year, are as follows: nonresidential buildings at $8,830,225,000, up 4 percent; residential buildings at $13,572,701,000, up 24 percent; heavy engineering at $6,202,166,000, down 18 percent; and total construction at $28,605,092,000, up 6 percent.



—September, 1959, Finished Portland Cement—

SUMMARY—Production of finished portland cement in September, as reported to the U. S. Bureau of Mines, totaled 32,590,000 barrels, an increase of 3 percent over September, 1958. Mill shipments in September, 1959, totaled 35,098,000 barrels, an increase of 1 percent over September, 1958. Stocks of 25,341,000 barrels of finished portland cement on hand were 4 percent higher than those on hand September 30, 1959. Clinker production during September, 1959, totaled 30,121,000 barrels, an increase of 7 percent over the September, 1958, figure.

PRODUCTION—One hundred and sixty-eight (168) plants in 38 states and Puerto Rico reported a production of 32,590,000 barrels of finished portland cement during September, 1959, compared with 31,597,000 barrels produced in September, 1958.

Production of clinker during the month of September, 1959, was 30,121,000 barrels, compared with 28,124,000 barrels during the same month last year.

High-early-strength portland cement in September, 1959, totaled 1,144,000 barrels, an increase of 46 percent over September, 1958, production.

Prepared masonry cement production in September, 1959, of 1,368,000 barrels increased 2 percent over the September, 1958, production.

SHIPMENTS—Mill shipments of finished portland cement for September, 1959, totaled 35,098,000 barrels, compared to 34,767,000 barrels in September, 1958.

In September, 1959, shipments were higher in 13 districts and lower in 10 districts than in September, 1958. The greatest increases were in the Ohio and Illinois districts. The greatest decreases were in the Oregon-Washington, Kansas, and Wyoming-Montana-Idaho districts.

Mill shipments of high-early-strength portland cement totaled 1,249,000 barrels, an increase of 10 percent over the 1,137,000 barrels shipped in September, 1958.

Mill shipments of prepared masonry cement in September, 1959, totaled 1,566,000 barrels, an increase of 4 percent over the 1,509,000 barrels shipped in September, 1959. Over one-half of these shipments were from mills in the northern states east of the Mississippi River. Prepared masonry cements are shown in 376-lb. barrels, although they are sold in barrels of varying weights.

STOCKS—Mill stocks of 25,341,000 barrels of finished portland cement were on hand September 30, 1959, an increase of 4 percent over the 24,445,000 barrels on hand September 30, 1958. Stocks of clinker on hand September 30, 1959, totaled 13,425,000 barrels, a decrease of 13 percent from the 15,360,000 barrels on hand September 30, 1959.

FIRST NINE MONTHS OF 1959—For the January-September period, 1959, the volume of production of finished cement amounted to 257,189,000 barrels, compared with 226,851,000 barrels in the comparable period of 1958. Total shipments for the first nine months of 1959 are reported at 260,401,000 barrels; in the same period of 1958 total shipments were 229,274,000 barrels. (These figures do not include finished cement used in the manufacture of prepared masonry cement as follows: Sept. '58—264,000 barrels; Jan.-Sept. '58—1,945,000 barrels; Sept. '59—253,000 barrels; Jan.-Sept. '59—2,230,000 barrels.) ●

New $14,000,000 Cement Plant Scheduled for Calaveras

Plans have been announced for the immediate construction of a $14,000,000 cement plant in Redding, Calif., by Calaveras Cement Company, newly acquired division of Flintkote Company (see PIT AND QUARRY, November, 1959, p. 32). The 1,500,000-bbl. plant is scheduled for completion by March, 1961.

More than 1,500 acres of high-grade limestone and shale are available on the plant site — reserves equivalent for 172 years at the initial output rate. The project will be financed by Flintkote from internal funds.

For the first nine months of this year, American Cyanamid Company reported earnings of $40,028,000, up from $27,915,000 for the similar 1958 period.

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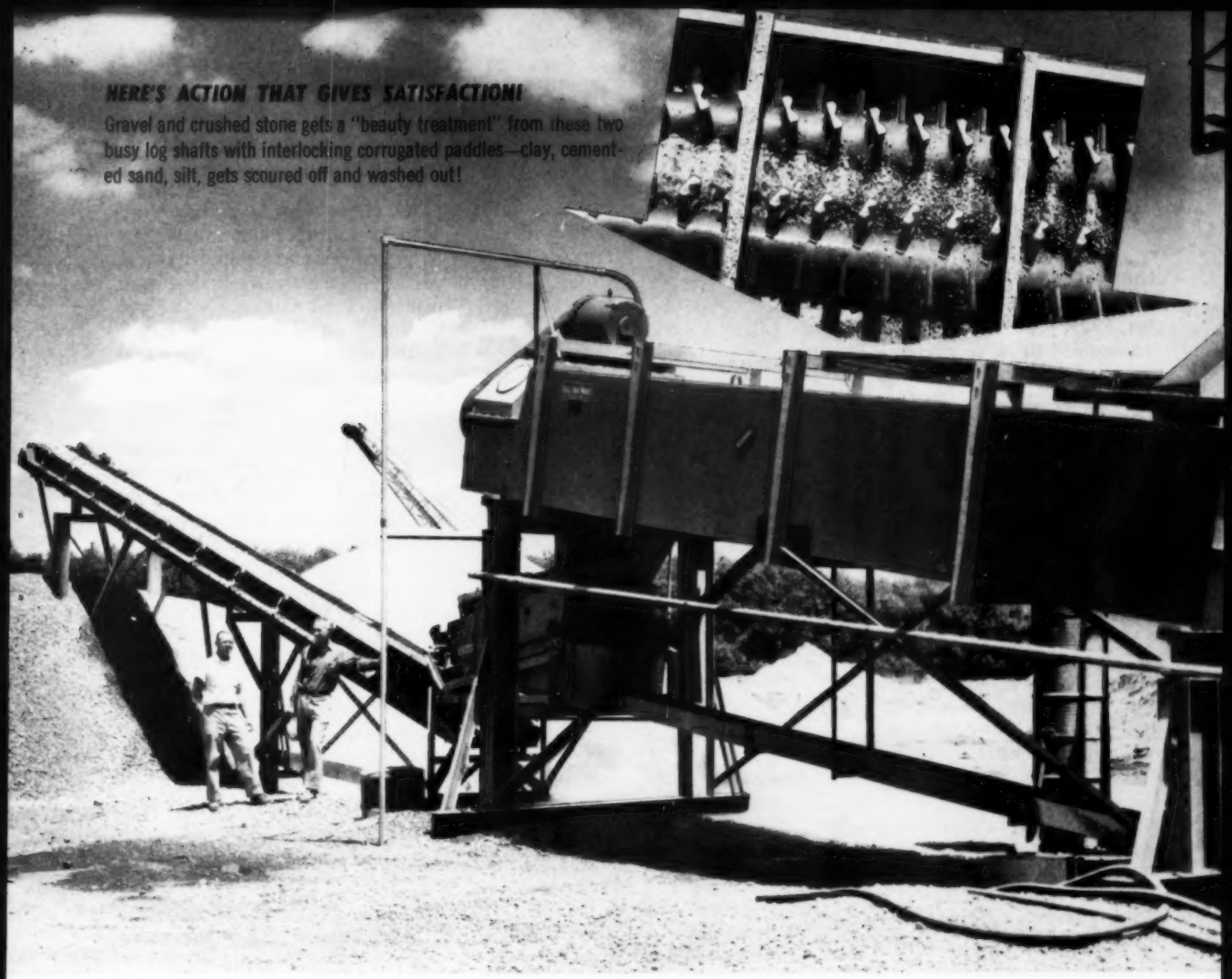
HERE'S ACTION THAT GIVES SATISFACTION!
Gravel and crushed stone gets a "beauty treatment" from these two busy log shafts with interlocking corrugated paddles—clay, cemented sand, silt, gets scoured off and washed out!

"Since buying our Eagle Log Washer

WE HAVE NOT SEEN A CLAY BALL IN OUR PRODUCT"

Walling Gravel Co., St. Johns, Mich.

There's just no better way to wash gravel or crushed stone than with an Eagle Log Washer—we have the word of users all over north America. The Walling brothers, Bert and Bob (pictured above) are typical. They report that an Eagle Log Washer solved their problem—all clay balls removed from their gravel.

The Eagle Log Washer is way ahead in design, based on Eagle's years of experience—non-deflecting tubular steel log shafts which turn without wear common to square shafts have bolted flange stub shafts that allow easy removal—paddles with two-piece wear resistant, corrugated shoes which permit top half of shoe to be replaced when worn instead of replacing entire shoe—water lubricated marine type bearings at lower end of tub (no problems from contaminated grease)—totally enclosed compound gear drive runs in an oil bath. No wonder that Eagle Log Washers are performing so well for so many users. See why—send for Catalog 58.

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Factory-Trained Distributors *Everywhere*

Work on $12,000,000 Plant Of Hawaiian Cement Co. Rushed for '60 Completion

Hawaiian Cement Corporation's $12,000,000 plant is rapidly nearing completion on a 27-acre site at Barber's point in leeward Oahu, Hawaii. (See PIT AND QUARRY, August, 1959, page 27.)

Scheduled to be in operation by next summer with a capacity of 1,000,000 bbl. annually, the plant will have facilities to expand to 3,000,000 bbl. whenever this move becomes necessary.

Construction of the administration building is under way, the crusher and its foundations have been installed, the 22 silo foundations also have been placed, the 100-ft. kiln exhaust stack has been erected, and excavations for all major equipment have been finished.

Already at work at the site is a 40-ton truck crane equipped with 175-ft. booms. A 40-ton hammermill impact crusher which will reduce limestone from 3-ft. to ⅜-in. size is also on location. The kiln and grinding and finishing machinery are now being manufactured in Denmark.

Construction of the plant is a joint building venture of Hawaiian Dredging & Construction Company (also part-owner of Hawaiian Cement) and the Bechtel Corporation.

Photo by Camera Hawaii

During a recent inspection trip, executives of American Cement Corp. and Cyprus Mines Corp. (major owners of Hawaiian Cement Corp.) take a look at a part of their building project—the 100-ft. kiln exhaust stack. Left to right: Garner A. Beckett, board chairman of both Hawaiian and American Cement; H. T. Mudd, president, Cyprus Mines; and R. D. Fisher, president, Hawaiian Cement; vice-president, Cyprus Mines.

N. Y. Trap Rock Plants Report Safety Records Of 1,000,000 Man-Hours

All safety records of New York Trap Rock Corporation installations (four quarries and a shipyard) were surpassed recently when the firm's plants at Tomkins Cove, N. Y., and Clinton Point (Poughkeepsie) both posted safety records of 1,000,000 man-hours worked without a lost-time accident. This is the first such record in the firm's history.

The Tomkins Cove plant totaled its new safety record on September 22, while the Clinton Point plant reached the record mark on October 26. Tomkins Cove employees, under superintendent John Jorgensen, have not had a lost-time accident since September 1, 1955. The Clinton Point crews, under superintendent George White, began their record period December 16, 1956.

Employees of both plants have shared cash incentive bonuses totaling thousands of dollars. (See PIT and QUARRY, July, 1959, p. 129.)

1958 U. S. Fire Clay Use Continues Downward Trend

Fire clay sold or used in the United States decreased 18 percent to 8,808,175 short tons in 1958, compared with 10,805,099 tons in 1957, and 11,803,093 in 1956, according to reports submitted by producers to the U. S. Bureau of Mines. A substantial decline in demand for fire-clay brick was responsible for most of the drop.

While Ohio, Pennsylvania, and Missouri (the three states producing the largest quantities) all reported large decreases in demand, a 66 percent increase was reported for Illinois. Principal uses in 1958 were for heavy clay products (51 percent of the total output, 43 percent in 1957) and for manufacture of refractories (44 percent of the 1958 total, 52 percent in 1957).

Lime Sales in August, 1959

Domestic sales of open-market lime in August, 1959,—549,497 short tons—decreased from the previous month's output, according to reports made by producers to the United States Bureau of Mines.

Agricultural lime increased, whereas decreases were noted in construction, refractory, and chemical and industrial lime.

Lime Sold by Producers[1] in the United States, in Specified Periods of 1958-59, by Types and Major Uses in Short Tons

	July	August		January-August	
	1959	1959	1958	1959	1958
By types:					
Quicklime	509,854	375,714	478,978	4,777,974	3,619,000
Hydrated lime	181,896	173,783	170,917	1,352,668	1,245,044
Total	691,750	549,497	649,895	6,130,642	4,864,144
By uses:					
Agricultural:					
Quicklime	3,261	6,011	5,783	47,122	33,469
Hydrated lime	5,463	5,713	7,593	80,523	87,916
Total	8,724	11,274	13,376	127,645	121,385
Construction:					
Quicklime	7,584	7,573	11,616	86,222	86,911
Hydrated lime	97,780	93,860	87,826	659,340	604,172
Total	105,364	101,433	99,442	745,562	691,083
Chemical and other industrial:					
Quicklime	393,171	319,056	323,628	3,225,069	2,509,590
Hydrated lime	78,653	74,210	75,498	612,805	552,956
Total	471,824	393,266	399,126	3,837,874	3,062,546
Refractory (dead-burned dolomite)	105,838	43,074	137,951	1,419,561	989,130

[1]Also includes a quantity of captive tonnage. The monthly canvass excludes the output of plants producing less than 10,000 tons a year.

NO SHIFTING REQUIRED

to back this JOHN DEERE Diesel Loader

The clutch-type direction reverser does it—puts the tractor into reverse or forward, maintaining a constant working speed, and adding extra tons to your day's work output.

Production gets another boost from this loader's self-leveling bucket. Dumped from full height, bucket returns to digging angle by use of the boom-control only. Same bucket action speeds light grading. In heavy digging, a 35-degree bucket roll-back provides plenty of power to insure full loads in a hurry.

Your dealer has more information about the many cost-cutting features built into this compact, highly maneuverable Diesel loader. And he's ready to show you how easily you can own it through terms of the John Deere Credit Plan. Have him set up a demonstration at your convenience.

Basics on the JOHN DEERE CRAWLER-LOADER

Pry-Out Pressure 8500 pounds
Dumping Clearance.... 10 feet
Dumping Angle at Full Height..... 50 degrees
Capacity, Heaped... 7/8 yard

John Deere Industrial Division, Dept. 568, Moline, Illinois

JOHN DEERE *"Specialists in Low-Cost Power with a Heavyweight Punch"*

How American Brake Shoe Maximates Production

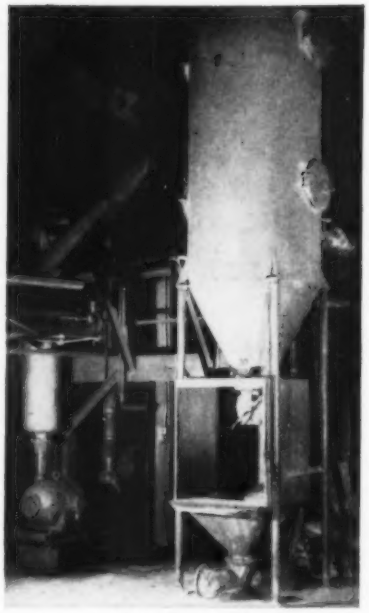
When the American Brake Shoe Company began an extensive modernization program at its New Castle, Delaware plant, one of the first steps management took to maximate production—that is achieve maximum output at less cost—was to install a Hoffman pneumatic conveying system for keeping bentonite, dextrin, silica flour and other materials *on the flow*. With a Hoffman exhauster furnishing the air as well as suction for the handling system, and use of components described here, the equipment not only simplified bulk conveying chores but paid its way in a few months by providing substantial production, material and labor savings.

MATERIAL INTAKE VALVE

Materials are introduced into the air stream through a unique nonclogging intake valve attached to the bottom of a hopper and flow smoothly through pipe lines to any one of six primary cyclone storage tanks more than 350′ distant. Hoffman intake valves insure the uninterrupted flow of dry, powdery or granular materials through all types of vacuum conveying systems. Suitable for use with 2″ through 6″ pipelines, they are equipped with standard 8″ flanges and can be easily attached to bins, hoppers, or dust collectors. Connected equipment is protected from exposure to the full suction of the system by a separate air inlet. The material handling rate can be adjusted while air is flowing. Thorough mixing insures smooth transit.

HINGE VALVE

Self-cleaning Hoffman hinge-type discharge valves are designed for air-tight closure against a head of material. The one-piece valve body is cast of gray iron with its rubber-faced disc and seat completely inside



A portion of the Hoffco-Veyor system installed at the American Brake Shoe Co. plant in New Castle, Delaware.

the casing. Lever linkage permits operation by means of chain or cable from a remote station. Provision can also be made for air or hydraulic cylinder actuation of the valve.

ROTARY VALVE

Chain driven rotary discharge valves of cast semi-steel construction feed the material in controlled quantities. Designed for interchangeability of various types of fabricated and cast rotors, valves are equipped with torque limiting drive sprockets for protection against jamming and overloading. Equalizing connections permit attachment of bleed lines to vacuum or pressure source. Inspection of the interior can be made through an access port without disassembly of the valve.

PERISTALTIC VALVE

Controlled expansion and contraction of rubber diaphragms permit discharge in measured quantities. Since there are no internal moving parts, even coarse abrasives can be handled with minimum wear. Sheet rubber diaphragms are easily replaced whenever necessary.

COMPETITIVE ADVANTAGES

In handling quantities of dry, free-flowing powdery and granular materials such as sand, shot, chemicals, etc., Hoffco-veyor systems and components speed production—provide many genuine benefits and advantages which are reflected in higher profit margins. These include:

- flexibility
- cleanliness
- time saving
- lower initial cost
- easy installation
- material saving
- labor saving
- pay for themselves

FREE ENGINEERING SERVICE

If you have a materials handling problem, you can solve it with either a complete Hoffman system or any of its parts which may be purchased separately to fit your needs. Available equipment includes dependable centrifugal blowers/exhausters, cyclones, collectors, material intake, hinge, rotary, butterfly and peristaltic valves as well as filter bag collectors. We'll be glad to make a free engineering survey to determine how you can improve your manufacturing methods by maximating production with a really tight method of material handling. Send now for a free descriptive booklet. Please write:

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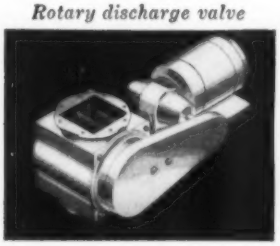
Dept. EM
U. S. Hoffman Machinery Corp.
103 Fourth Avenue
New York 3, New York

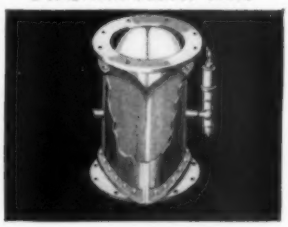
Material intake valve

Hinge valve

Rotary discharge valve



Peristaltic rubber valve



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for rock or ore

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TELSMITH Gyrasphere®

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New 66" Telsmith FC Fine Crushing Gyrasphere with grooved pulley suitable for V-rope drive and with oil tank, oil piping and separate oil pump and motor are standard equipment on the new 66" Gyrasphere.

● The new No. 66 Gyrasphere combines all the big production, low-cost operation and maintenance features of other Telsmith Gyraspheres—plus new, simple and easy, hydraulic adjustment of discharge opening. Our new Bulletin No. 274 explains all of the outstanding features of the new No. 66 and gives complete information, including new capacity tables, on all sizes of Telsmith Gyraspheres. These are the Secondary Crushers which will give you *the lowest cost per ton.*

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German Lime Meeting Attracts High Attendance, Guest at N.L.A. Reports

A highly successful German Lime Association Operating Meeting was held in October, reported Herman Lange, president of the German Lime Association (see National Lime Operators' Sessions story, on page 103), when he attended the recent National Lime Association Operating Meeting in Philadelphia. Representatives from six other foreign European countries attended the sessions, which had a total attendance of 353.

The German lime operators meet every other year. It is the major lime meeting in Europe, both from a program and attendance standpoint.

Our Cover Picture

● Quarrying under water in the Everglades is the subject of the cover picture this month. The operation is the new plant of the Lehigh Portland Cement Company on the Tamiami Trail west of Miami, at the eastern edge of the Everglades. This 2,500,000 bbl., $25,000,000 plant was literally raised from the near-sea-level swamps, and its quarry is completely under water. Special methods were developed to operate efficiently. A rotary core-type drill is used, and explosives are loaded through the steel. In blasting operations, the water keeps the broken rock close to the face, and it is excavated by the dragline shown on the cover. This is a Bucyrus-Erie electric walker with a 200-ft. boom and an 8-cu. yd. perforated bucket. (See page 76 of this issue.)

U. S. Bureau of Mines Continues Aggregate Studies

Long-range studies conducted by the U. S. Bureau of Mines on mineral aggregates will continue during the 1960 fiscal year. Enormous tonnages of aggregates are required for highway and other construction programs, and many problems are being encountered by producers of these materials.

In helping to solve such problems, the Bureau will conduct research on explosives, methods of fragmentation, and the effects of blasting vibration. Fundamental studies have been started on the physics of rock breakage, using both standard equipment and special instruments.

Attention will focus on characteristics and damaging effects of blasting vibrations on structures. Other research will involve mining and processing methods.

Federal Highway Funds Allocated for Continuance Of National Road Program

In order to continue without interruption the expanded national highway program launched in 1956, Frederick H. Mueller, Secretary of Commerce, recently apportioned $2,725,000,000 of federal aid to the states for the fiscal year 1961.

These apportionments, comprising $1,800,000,000 for the National System of Interstate and Defense Highways (the backbone of the nation's highway transportation network, for which the Federal Government is paying 90 percent of the cost) and $925,000,000 for the federal aid primary and secondary systems and their urban extensions, are for the fiscal year which begins July 1, 1960.

A pay-as-you go basis for the scheduling of federal reimbursement to the states reportedly made the 1961 appropriations possible. They are also a result of the new Federal-Aid Highway Act of 1959, which upped the federal motor-fuel tax rate from 3 to 4 cents per gallon for the period October 1, 1959, to June 30, 1961.

The announcement of the amounts of funds available was made to assure approximately nine months lead time to the states for adequate planning of their use of the money, and thus ensure continued orderly progress in the program.

California Facility Planned For Jefferson Lake Sulphur Co.

Spokesmen for Jefferson Lake Sulphur Company, New Orleans, have announced the firm's intention to exercise an option to acquire a major deposit of chrysotile asbestos near Stockton, Calif., from American Asbestos Co. of New York.

The price of the tract reportedly is $4,200,000, and payments will be handled through a wholly-owned subsidiary of Jefferson Lake Sulphur.

Exploration work has proven approximately 15 million tons of commercial grade ore, and more reserves are indicated. It was stated that Jefferson Lake management will install mining equipment and a mill with a capacity of 2,000 t.p.d.

● There are now more than 1,000,000 Americans who have been cured of cancer, and who are leading healthy, normal lives. They were saved because they went to their doctors in time. Don't think you can afford to say you are "too busy" to have regular check-ups at your doctor's office.

TOO BUSY

to give up a few hours a year for a health checkup?

Your best cancer insurance is a thorough checkup every year, and alertness to Cancer's 7 Danger Signals.

Learn how to guard yourself against cancer. Write to "Cancer" in care of your local post office, or call your nearest office of...

American Cancer Society

Don't look at the load on the belt... look at its edge

Notice the shiny band the edge of the belt has polished on the vertical training idler? Acme-Hamilton forestalls this critical wear condition by building extra-durable square edges on all its belts ... . a good point to file for future reference if edge wear is plaguing you.

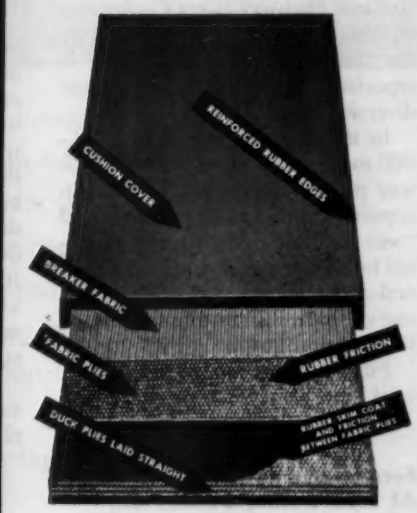
Reinforced Edges and covers defy abrasion, cutting, sharp impacts.

Breaker Fabric. Optional double cord fabric acts as second cushion, increases cover adhesion.

Fabric Plies. Impregnated with rubber to add strength.

Rubber Skim Coat. Provides a resilient bed between plies.

Write Acme-Hamilton, Dept. Q3.



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Canadian Gypsum Co. Completes First Stage Of Hagersville Expansion

Canadian Gypsum Company of Toronto, Ont., has now completed the first phase of a multimillion-dollar expansion at its Hagersville, Ont., plant. The program has increased gypsum plaster production capacity by 50 percent. New equipment added includes modern electronic controls.

By early 1960, new facilities for product manufacture (plaster base, sheetrock gypsum wallboard and gypsum sheathing) will double original plant capacity and provide sufficient production to finish the walls and ceilings of over 50,000 houses annually.

Included in the company's expansion program is the recent expansion of lime production facilities at Guelph, Ont., and construction of a new warehouse at the company's Montreal plant.

Highway Funds Diversion Tops $300,000,000 in 1958

During 1959, a total of $303,326,000 in state highway user tax receipts was diverted to non-highway purposes. This action was described as virtually a cross-country "raid on highway funds."

This revelation was made in a National Highway Users Conference analysis of data recently released by the Bureau of Public Roads. It is reportedly the third-highest annual diversion total.

In the diverting states $37,700,000 more was utilized for non-highway purposes than was received in apportionments from the so-called "anti-recession" emergency federal-aid funds made available by the Federal-Aid Highway Act of 1958. In one state, diversion was almost seven times as much as the apportionment.

Funds diverted since 1934 now total more than $5,036 million.

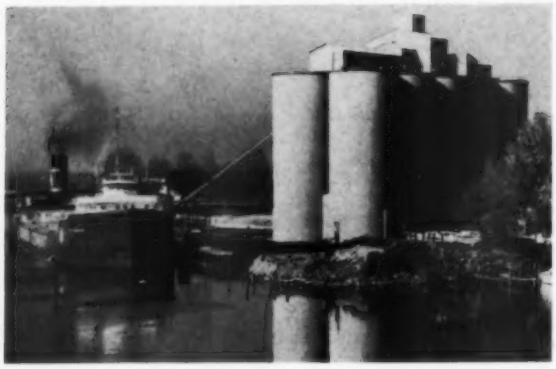
Formal Dedication Held At Ideal's Ada, Okla., Plant

Formal dedication of Ideal Cement Company's new Oklahoma wet-process plant at Ada was held last month. (The original plant was expanded in two stages.) The new facility, which cost more than $20 million to build, is a showplace of concrete construction.

It is also one of the most highly instrumented and mechanized cement plants in the world today. The entire production process is controlled from a single centralized control room. One of the features of the plant is the 5½-mile overland belt system between the quarry and the plant—the longest permanent overland belt conveyor ever built. It utilizes prestressed, precast lightweight concrete. More than $1.5 million was spent on dust collection equipment.

Output of the two rotary kilns, each 450 ft. by 12 ft., ups the Ada plant capacity to 5,500,000 bbl.

Plans for a new plant in Deland, Fla., have been announced by the management of Pozzolith, Inc., which has headquarters in West Palm Beach. Products will be lightweight aggregate and a concrete additive.



The first Huron cement freighter to unload at the firm's new distributing plant at St. Joseph, Mich., was the steamer "S.T. Crapo," flagship of the Huron Portland Cement Company fleet of six self-unloading bulk cement freighters.

Huron Holds Open House At New Distributing Center

Last month the official opening of the million-dollar plus distribution center at St. Joseph, Mich., was held by Huron Portland Cement Company, a subsidiary of National Gypsum Company. The new facility was shown to more than 400 customers, suppliers, and friends in an open-house program.

This thirteenth in Huron's chain of distributing plants located in Great Lakes cities has ten silos with a total capacity of 150,000 bbl. of cement. The plant occupies a man-made site on the St. Joseph river—20,000 cu. yd. of fill converted the marine site into land.

Cement is pumped to the silo penthouses through Fuller-Kinyon pipes; the pumping machinery is located in the holds of the six self-unloading bulk cement freighters of the Huron fleet. (See photograph). The loading facilities utilize screw conveyors and the Huron-pioneered Air-Slides.

Indiana Firm Incorporated To Process Silica Sand

White Silica Sand Company, Incorporated, has been incorporated at New Albany, Ind., to mine and process sand for foundries and glass-making plants.

The plant, just off Indiana 335, has already gone into operation, producing at the rate of about 400 t.p.d. It will also produce crushed stone and gravel.

• Correction

The U. S. Bureau of Mines has corrected the previously released figure for June, 1959, domestic sales of open-market lime published in PIT AND QUARRY, October, p. 44 to a revised total of 870,000 tons. Consequently, June is only the second-highest month on record—next to the 895,000 tons for May, 1959. In July lime shipments in all categories dropped to 691,750 tons due to the steel strike.

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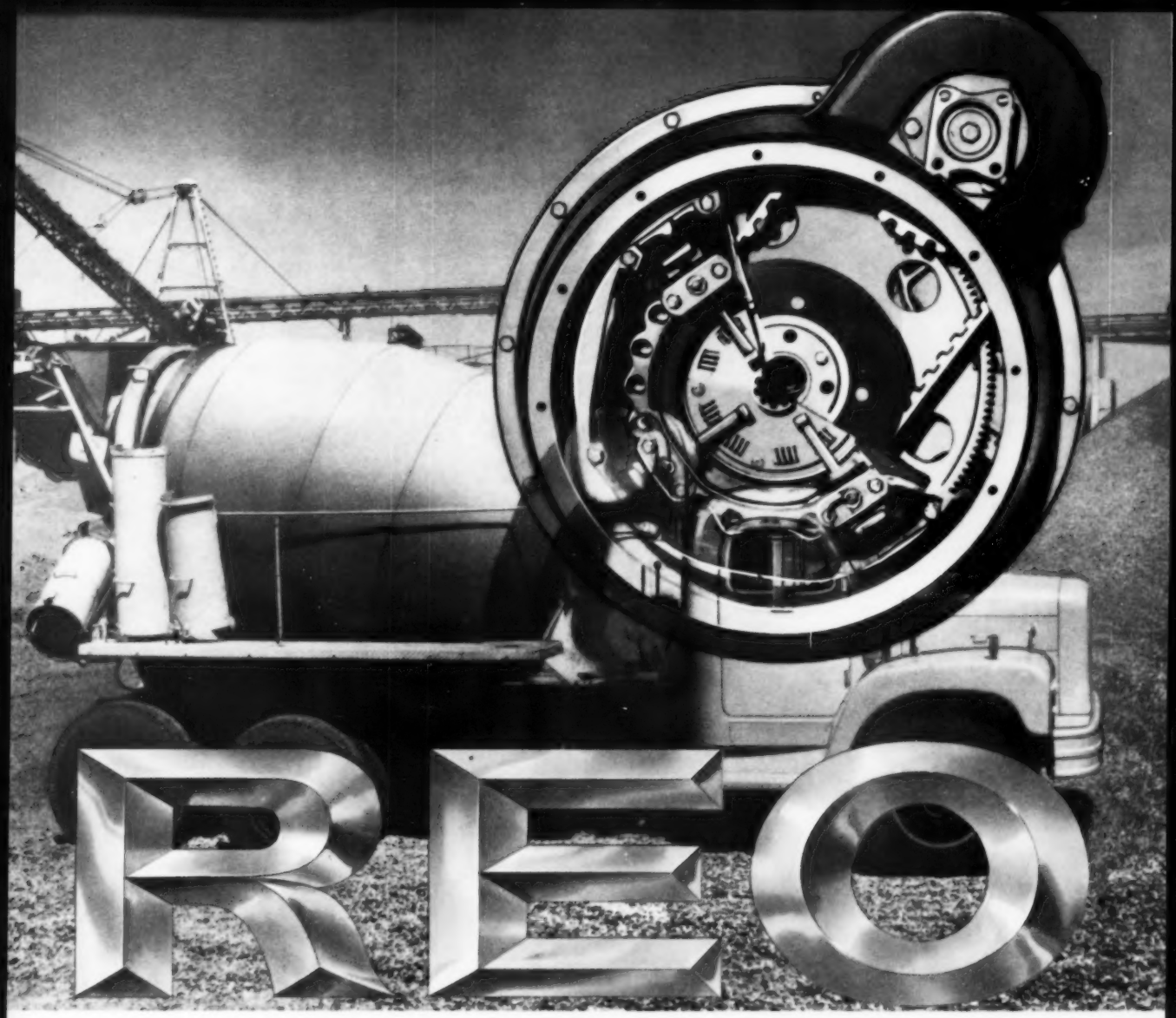


Reo's revolutionary new Flywheel P.T.O. brings to transit mix operators a "*bonus*" *payload increase from 400 to 600 lbs. per trip*—actual weight savings in a 6½ cu. yd. mixer unit resulting from the elimination of separate engine power. Also eliminated are the headaches of separate service and maintenance requirements.

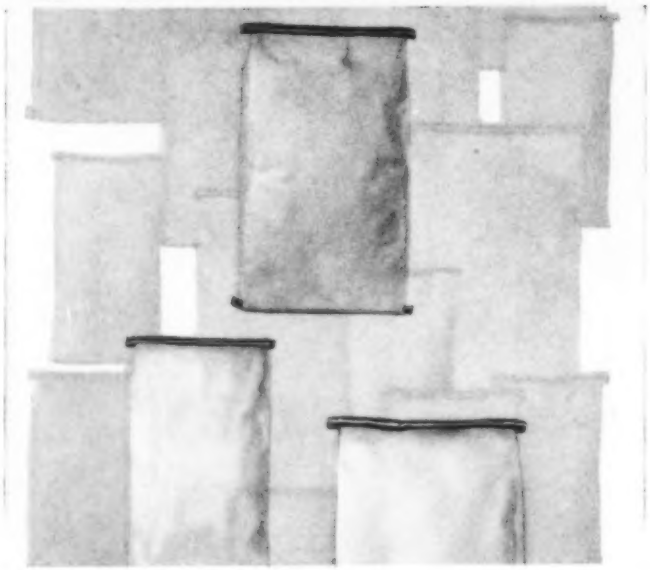
Reo engineered and installed as an integral part of the chassis engine drive, the Reo Flywheel P.T.O. supplies the mixer with a lighter and more efficient new source of power—smooth . . . even flowing . . . direct.

Most important, operators can have the "bonus" payload advantage of Reo's new P.T.O. at a low initial cost of equipment. Now available in Reo's rugged "C" Series line of transit-mix trucks. Another product of Reo's creative engineering skill has been added to the many important values found only in Reo Trucks. Reo Division, The White Motor Company, Lansing, Michigan.

Gold Standard of Values

in one year over 165 multiwall users reduced total packaging costs through UNION-CAMP's

SPECIFICATIONS CONTROL



another FREE service of the ★ **5** *Star Packaging Efficiency Plan!*

Could more efficient specifications control help you get more for your multiwall dollar? It has for more than 165 other firms who took advantage of the 5-Star Packaging Efficiency Plan. In one year alone!

UNION-CAMP multiwall specialists reduced total packaging costs for these companies by applying proved principles of specifications control. For example, standardizing bag styles—eliminating special or odd bag sizes. The improvements simplified filling and closing—reduced inventory levels. They also freed valuable warehouse space—saved tens of thousands of dollars a year.

There's probably a phase of your operation where substantial economies could be effected by the 5-Star Plan. Apart from specifications control, this packaging service offers you profit-producing improvements in bag design, bag construction, packaging machinery—plus a detailed survey of your plant.

And it doesn't cost a penny!

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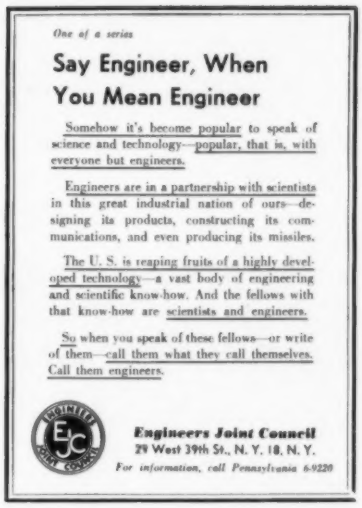
56th Annual Convention Of A.C.I. Scheduled In New York, Mar. 14-17

The 56th annual convention of the American Concrete Institute will be held March 14-17, 1960, at the Commodore Hotel, New York, N. Y. The technical program, beginning Tuesday afternoon, March 15, will feature approximately 30 papers during eight scheduled concurrent sessions.

Topics to be covered include the following: model tests and highways; materials; structural and design research; restoration of deteriorated concrete; and design and construction.

During the highway session, there will be a discussion of air-entrained concrete based on 20 years of use, and also a paper on gravel beneficiation in Michigan. Among the topics to be considered in the materials session will be the freeze-thaw resistance of concrete made with lightweight aggregates, the effect of maximum size of coarse aggregate on properties of concrete, and related matters.

The organization's annual research session on the last day will feature progress reports on concrete from institutions throughout the world.


One of a series
Say Engineer, When You Mean Engineer
Somehow it's become popular to speak of science and technology—popular, that is, with everyone but engineers.
Engineers are in a partnership with scientists in this great industrial nation of ours—designing its products, constructing its communications, and even producing its missiles.
The U. S. is reaping fruits of a highly developed technology—a vast body of engineering and scientific know-how. And the fellows with that know-how are scientists and engineers.
So when you speak of these fellows—or write of them—call them what they call themselves. Call them engineers.
Engineers Joint Council
29 West 39th St., N. Y. 18, N. Y.
For information, call Pennsylvania 6-9220

● Another in a series of Engineers Joint Council posters pointing up the work and the importance of engineers. It states clearly some of the many services of modern engineers—with special emphasis on the fact that "scientists make it known; engineers make it useful."

Reclamation Projects Begun By Producers in Maine, Ohio

Land reclamation projects have been implemented recently by two nonmetallic minerals producers—the Leeds Sand and Gravel Company, Leeds, Maine, and the Ohio Gravel Company, New Baltimore, Ohio.

The Leeds company has begun a long-term plan of reforestation by leveling acres of worked-out land along route 106 in Maine and planting white pines—1,200 seedlings to the acre. The three-year trees are supplied by the Maine state nursery. In addition to gaining community good will by beautifying the area, the company will add to the state's lumber resources and in future years realize a profit from the sale of mature trees.

In the Ohio Gravel Company's undertaking, the firm is co-operating with the Crosby Township Civic Association in a plan to convert an old 24-acre gravel pit into a community recreation ground. The deed for the land was recently turned over to the association by Walter J. Flach, executive vice-president of the gravel firm. The pit has been leveled, and work has begun on laying out a baseball diamond for the Crosby Township School. Future projects include a picnic area, tennis courts, and a swimming pool.

National Gypsum's Expansion At Savannah Completed

A major expansion at the National Gypsum Company plant in Savannah, Ga., has been completed, reportedly making its the "largest gypsum plant in the world." The expansion program resulted in a 25 percent increase in plant capacity—with a total available output sufficient to produce enough gypsum wallboard, lath, plaster, and other products for approximately 100,000 homes a year.

The plant now has been expanded 300 percent since it was built in 1939. Warehouse space at the plant was substantially enlarged, along with production facilities.

Alan Taylor Re-elected E.S.C.S. Institute President At Meeting in Toronto

Alan Taylor of the Kenlite Company, Louisville, Ky., was re-elected to another one-year term as president of the Expanded Shale, Clay and Slate Institute at the annual meeting held in Toronto last October. This was the first annual meeting outside the United States.

At a panel discussion meeting Harold Hutchens, Carter-Waters Corporation, Kansas City, Mo., discussed the design of reinforced concrete made with Haydite aggregates. The industry has no trouble producing 4,000 p.s.i. concrete with proper steam curing, he said; and strengths as high as 8,000 p.s.i. have been attained in 28 hours. Mix design has been standardized so that design is no more complicated than that for heavyweight concrete. Mr. Hutchens cited a recent American Concrete Institute standard covering recommended proportions for mix designs.

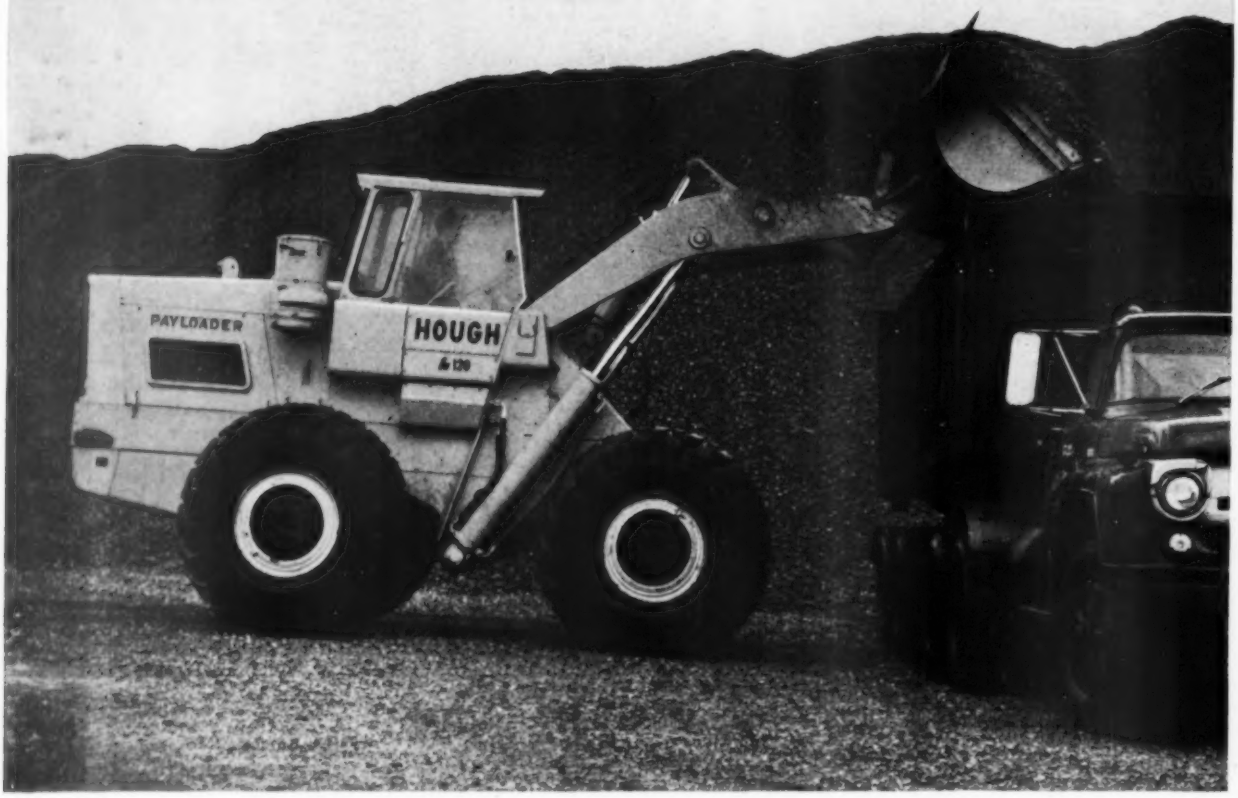
M. W. Huggins, professor of civil engineering, University of Toronto, pointed out in his talk that reduced dead weight of lightweight aggregate block saves money in shipping and handling. He emphasized that one of the largest fields open for lightweight structural concrete is in long-span structures, where dead weight is important.

Fused Refractory Subsidiary Formed by Two Major Firms

Harbison-Carborundum Corporation was recently formed on a 50-50 ownership basis by Harbison-Walker Refractories Company, Pittsburgh, and The Carborundum Company, Niagara Falls, as a jointly owned subsidiary for the engineering, manufacture, and sale of fused refractories. Harbison-Walker is a major refractories manufacturer, and Carborundum is a principal firm in the abrasives market and a leader in the manufacture of super refractories.

The new firm will own and operate Carborundum's recently modernized and expanded Monofrax fused refractory plant in Falconer, N. Y. Additional new facilities are contemplated for the manufacture of chromite magnesia base fused refractories.

why is PAYLOADER® the



LOADING — New H-120 handles up to 7 tons per pass; lifts to more than 14½ feet under hinge pin; has forward reach of 3½ feet ahead of front tires. Buckets to 6 cu. yds.

CHARGING HOPPERS — This is a popular and highly-efficient use for all sizes of "PAYLOADER" tractor-shovels because of their fast shuttle cycles made possible with power-shift transmission.

STOCKPILING — Whether shifting stockpiles, spreading them, or cleaning up around them, "PAYLOADER" units have the speed, and the more reliable traction from power transfer differentials to do a fast job.

STANDARD OF ANY COMPARISON?

The growing trend toward the use of versatile, rubber-tired tractor-shovels makes it increasingly vital for pit, quarry and plant owners to know why "PAYLOADER" units are the overwhelming choice and the standard of comparison.

It is because HOUGH pioneered the first integrated rubber-tired loader more than 20 years ago and the first four-wheel-drive tractor-shovel over 11 years ago.

It is because HOUGH has developed most every feature and major improvement during these years. Items like the rear-mounted engine; bucket tip-back; the use of torque-converters, power-shift transmissions and planetary axles.

It is because HOUGH's "balanced-design" gives better stability and keeps "dead-weight" at a minimum. The result is a better "horsepower-to-weight" ratio for top production.

It is because "PAYLOADER" units have a closed, pressure-controlled hydraulic system with dual and triple filtering.

It is because all HOUGH four-wheel-drive units cool the power-shift transmission and torque-converter oil with a separate oil-to-air cooling radiator.

It is because HOUGH offers a larger selection of machines for specific jobs. More than 20 models in 8 different capacity ranges for your consideration.

It is because there have been more integrated rubber-tired "PAYLOADER" tractor-shovels sold than all other makes.

It is because these machines are sold and serviced by the finest, most completely equipped distributor organization in the whole wide world. Why not contact him?

HOUGH®

THE FRANK G. HOUGH CO.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

HOUGH, PAYLOADER, PAYMOVER, PAYLOGGER and PAY are registered trademark names of The Frank G. Hough Co., Libertyville, Ill.

QUARRY LOADING — The powerful breakout, tip-back digging action of a "PAYLOADER" bucket is what it takes to get big loads of large-size stone in fast single passes.

EXCAVATING — "PAYLOADER" applications are not limited to rehandling. Many are used to dig and load direct from the bank or pit and to strip overburden.

UNDERGROUND — Many "PAYLOADER" units are in underground mines and doing clean, efficient jobs. Diesel power with exhaust scrubbers are available.

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send data on all "PAYLOADER" models and attachments

Name.....

Title.....

Company.....

Street.....

City.....State.....

12-B-4

Good Materials Market, 1% Drop in Awards In 1960, Dodge Predicts

Construction contracts in 1960 will drop slightly from the record-breaking volume anticipated this year, F. W. Dodge Corporation predicted in its annual outlook statement. The 1 percent decline to $36,040,000,000 will be the first year-to-year decline since the end of World War II.

A drop in housing to $15,900,000,000 will offset gains in other major construction categories next year and will produce a slight drop in total construction contracts in 1960, the statement predicted. The decline in total private and public housing starts will be due primarily to builders' difficulty in financing new homes. Housing is the largest single construction category.

Most of the strength next year is expected in non-residential contracts, with every major building type showing gains over the 1959 levels. Total estimated non-residential contracts (factories, commercial buildings, schools, hospitals, churches, and public buildings) in 1960 are $12,400,000,000—up 7 percent. Heavy engineering contracts (highways, dams, utilities, and airports) in 1960 will total $7,800,000,000—up 2 percent, according to Dodge.

The optimistic side of the prediction concluded: "The market for construction materials and services in 1960 will be among the largest in history and the forerunner of even more prosperous years ahead."

● Ideal Cement Company officials stated that about 75 percent of the work had been done on the firm's new hangar at Stapleton Airfield when this picture was taken recently. The $100,000 structure is being readied for Ideal's big new Fairchild F-27 turbo-prop business plane. Its thin-shell concrete arch is diamond-shaped and spans 160 ft. without center supports.

Floorspace of the hangar totals about 9,400 sq. ft., and the apex of the roof rises to a height of 33 ft. Mosaic-type aggregate concrete block walls will enclose the building at the front and rear.

Erie Sand-Gravel Ordered By F.T.C. to Sell Ohio Division

Stating that the March, 1955, purchase of the Sandusky Division of the Kelly Island Company by Erie Sand and Gravel Company, Erie, Pa., violated the Clayton Act and lessened competition in the area, the Federal Trade Commission recently ordered Erie Sand and Gravel to dispose of the assets it acquired through the purchase.

The federal agency adopted the decision of initial hearing examiner Abner E. Lipscomb (made on December 2, 1958) on the basis of these probable effects: "a substantial lessening of competition and a tendency to give Erie a monopoly in the sale of lake sand in the relevant market . . ."

Erie and Sandusky sold 91.8 percent of all domestic lake sand sold in the market area in 1954. In that year the remaining volume sold was shared by two other domestic suppliers.

Erie Sand and Gravel Company may appeal the divestiture order in federal courts.

Open-Pit Gypsum Recovery Planned for Wyoming Facility

Additional information on the proposed $3,000,000 operation of Big Horn Basin Gypsum Company in Cody, Wyo. (see PIT AND QUARRY, November, 1959, p. 102), reveals that the leased site contains from 37,000,000 to 41,000,000 tons of gypsum (calcium sulphate) deposits. It is estimated that there will be sufficient raw material available for 100 years.

An interesting detail stressed by Sid H. Eliason, president of Big Horn, is that it will be possible to mine an open face 75 ft. high for about 25 years. He added that the deposit (owned by the Taggart interests) is one of the few remaining major gypsum beds in the United States which can be worked easily by the open-pit method.

Mr. Eliason was a former executive of the United States Gypsum Company; he was also one of the founders of the Western Gypsum Company, which was later sold to Certain-Teed Produts.

Mines Bureau Exploration Of Silica Resources Planned

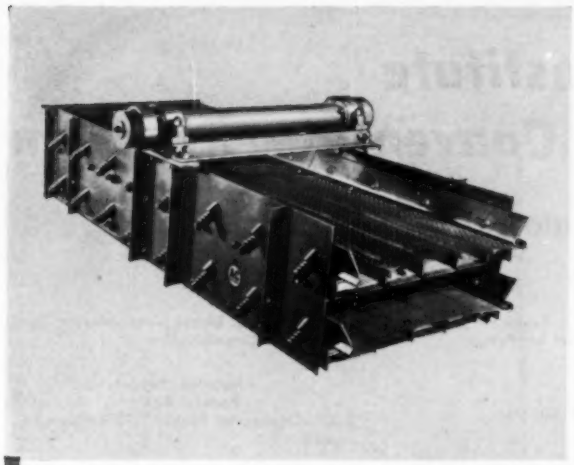
A quest for new sources of high-purity silica, particularly in the Pacific Northwest, is included in plans of the U. S. Bureau of Mines in the fiscal year (1960) now under way. The rapid industrial growth of this area has speeded depletion of commercially developed silica deposits and has created increased demands for high-quality silica.

Field examinations of silica occurrences and related laboratory testing of specimens will rate formations for commerical potentiality.

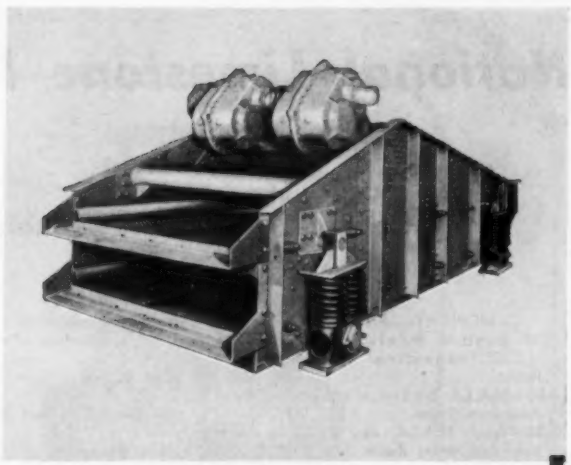
Japanese Cement Concern To Install 700-T.P.D. Kiln

The Chichibu Cement Company, near Tokyo, has purchased the 11th ACL cement-making process plant in the Far East, according to Allis-Chalmers International officials. The equipment will be manufactured by Kobe Steel Works, Allis-Chalmers licensee in Japan, and will be designed to produce 700 metric tons of portland cement per day.

In the last five years eleven such process plants have been installed in the Far East: four in Formosa, three in the Phillippines, and four in Japan.



For moderate to fine sizing — wet or dry. AVS *Aero-Vibe* inclined screen: Available with wire cloth or perforated plate surfaces. Maximum aperture — 1½ inches. 1, 2 or 3 decks. Sizes 3 by 6 to 5 by 10 feet.



For coarse to fine sizing — wet or dry, rinsing, or media recovery. *Low-Head* horizontal screen: Saves headroom. Wire cloth or perforated plate. Apertures to 2½ inches. 1, 2 or 3 decks. Sizes 3 by 6 to 8 by 20 feet.

FROM ALLIS-CHALMERS COMPLETE LINE

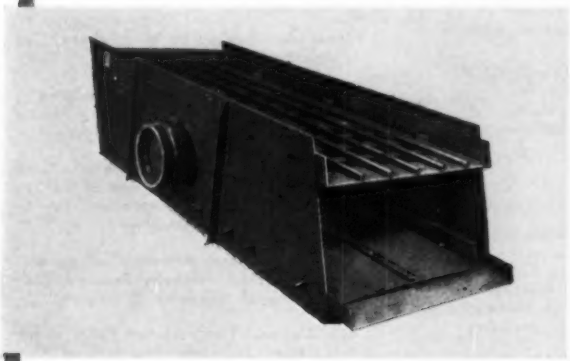
The right screen for your aggregate plant

FOR SCALPING, SIZING, RINSING, WASHING AND HEAVY MEDIA RECOVERY, ALLIS-CHALMERS PROVIDES THE SCREEN YOU NEED

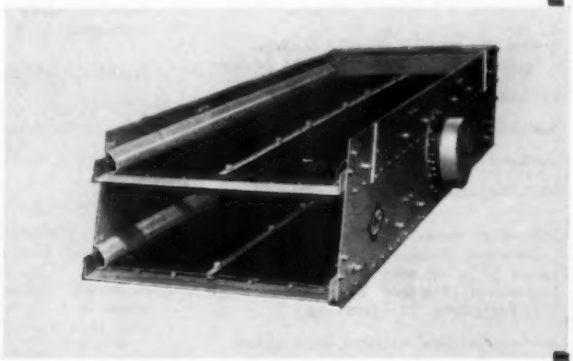
Large or small capacity — wet or dry crushed stone, sand or gravel — whatever your application there's an A-C screen for the job. Building the industry's most complete line of horizontal and inclined screens, Allis-Chalmers gives unbiased recommendations — suggesting to you the screen that will do your job at the lowest possible cost consistent with quality construction.

Built for a beating: There's no skimping on quality at A-C. For example, the frames of Allis-Chalmers screens are carefully machined and *stress relieved* for years of tough usage. Extra-large bearings give added life.

Easy to choose: A helpful screen selection guide has been prepared to help you pick the right model screen for your process. *Contact your Allis-Chalmers representative or write for Bulletin 25B6280, Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.*



For scalping and coarse sizing — wet or dry. XH *Ripl-Flo* inclined screen: Wire cloth, perforated plate, rod or stepped grizzly-bar surfaces. Apertures to 10 inches. 1, 2 or 3 decks. Sizes 4 by 8 to 8 by 14 feet.



For light scalping, coarse to fine sizing — wet or dry, and for rinsing. SH *Ripl-Flo* inclined screen: Wire cloth or perforated plate. Apertures to 5 inches. 1, 2 or 3 decks. Sizes 3 by 6 to 8 by 20 feet.

Aero-Vibe, Low-Head and Ripl-Flo are Allis-Chalmers trademarks.

ALLIS-CHALMERS A-1200-CM

National Limestone Institute Convention Program

Statler-Hilton Hotel, Washington, D. C., Jan. 18-21, 1960

MONDAY, JANUARY 18

8:00—Breakfast meeting, N.A.L.I. and N.C.L.I. executive committees—Ohio Room

10:00—N.A.L.I. board meeting—South American Room

12:30—Joint N.A.L.I. and N.C.L.I. luncheon—California Room

2:00—N.C.L.I. board meeting—South American Room

5:30—Reception—Pan American Room

6:30—Dinner—South American Room

8:00—Joint N.A.L.I. and N.C.L.I. board meeting—Federal Room

TUESDAY, JANUARY 19

Morning Session
Federal Room

9:00—First annual meeting of Agricultural Limestone Division

W. L. Bryan, chairman of the board, N.A.L.I.; president, Bryan Rock Products, Inc., Shakopee, Minn., presiding

Films, "Limestone Products for a Better Tomorrow," "The Green Cover"

Call to order and welcome

Report of minutes of meetings preparatory to this meeting

Treasurer's report—J. B. Mount

Reports of committees by chairmen—
By-Laws—Arnold W. Mulzer
Convention Arrangements—Leonard S. Fry
Finance & Budget—John M. Deely Jr.
Legislative, Public Relations, & Tax—Powell G. Potts
Membership—John J. Stark
Promotion & Education—George A. Zeigler
State Associations—Paul J. Andrew
Regional Committees—Robert M. Bridges

Old business

Election of officers and directors

New business

10:45—Adjourn

11:00—First annual meeting of Crushed Limestone Division

Thomas E. Lalley, president, N.C.L.I.; vice-president, Bradford Hills Quarry, Inc., E. Petersburg, Pa., presiding

Call to order and welcome by president

Report of minutes of meetings preparatory to this meeting

Treasurer's report—Taisto Laine

Reports of committees by chairmen—
By-Laws—Merrill M. Green
Convention Arrangements—Charles S. Bryan
Finance & Budget—Roger E. Meshberger
Legislative, Public Relations, & Tax—C. Wolfe
Membership—W. O. Faylor
Specifications—Robert M. Patton

Old Business

Election of officers and directors

New Business

12:15—Adjourn

GREETING LUNCHEON
Congressional Room
12:30

E. B. Snead, regional vice-president, N.C.L.I.; president, Texas Crushed Stone Co., Austin, Tex., presiding

"N.L.I. As I See It"—Robert M. Koch, president, N.A.L.I.; executive vice-president, N.C.L.I.

Afternoon Session
Federal Room
2:30

Thomas B. Stafford, N.A.L.I. regional vice-president; Vermarco Lime Co., Proctor, Vt., presiding

"Reducing the Effects of Radioactive Fallout on Agriculture in Time of Emergency"—Dr. Frank A. Todd, assistant to the administrator for emergency programs, Agricultural Research Service, U.S.D.A.

"Limestone as a Road-Building Aggregate"—D. O. Wolf, chief, concrete section, Division of Physical Research, Bureau of Public Roads

"We Need the Limestone Industry on Our Team"—George H. Enfield, extension agronomist, U. S. Dept. of Agriculture

MANUFACTURERS' DIVISION
GUEST NIGHT
Buffet Dinner-Dance
Presidential Ballroom
6:00

WEDNESDAY, JANUARY 20

Morning Session
Federal Room

9:00—Film, "Conquering Ripple Rock"

P. K. Alvord, chairman, Manufacturers' Division, E. I. du Pont de Nemours & Co., Inc., New York, N. Y., presiding

Discussion—operating problems, under leadership of Manufacturers' Division members

LUNCHEON
Congressional Room
12:30

Robert M. Patton, N.C.L.I. director; president, Davon, Inc., Columbus, Ohio, presiding

"Future of Small Business: S.B.A. Services"—Wendell B. Barnes, administrator, Small Business Administration

Afternoon Session
Federal Room

2:30—Operations Panel—T. C. Lalley, chairman

"How Screen Cloth Can Best Be Utilized in Efficient Screening of Minus 3/8-in. Material"—Robert Warner, Hoyt Wire Cloth Co., Lancaster, Pa.

"Geologic Features of Limestone Quarries" James A. Humphreville, consulting geologist, Lancaster, Pa.

3:30—Sales Panel—George A. Zeigler, N.A.L.I. director, M. J. Grove Lime Co., chairman

Promotional activities of Dolomite Products, Inc., Ocala, Fla.—Fred Y. Montsdeoca, sales manager, Dolomite Products, Inc.

Iowa Association's billboard advertisements—Clint A. Allen, executive secretary, Iowa Limestone Products Association, Des Moines, Iowa

Wednesday Evening—Open

THURSDAY, JANUARY 21

8:00—Manufacturers' Division breakfast meeting—Ohio Room

Elections and other business

9:00—General session—Federal Room

Russell W. Hunt, N.A.L.I. director; president, Southwest Limestone Co., Neosho, Mo., presiding

Film—"Lost Production in Highway Construction"

"The Agricultural Conservation Program"—Paul M. Koger, administrator, Agricultural Conservation Program Service

"Conservation Appropriations"—Cong. Jamie L. Whitten, chairman of the Sub-Committee on Appropriations for the Department of Agriculture

"Highway Research Activities"—Fred Burggraf, director, Highway Research Board of National Academy of Sciences

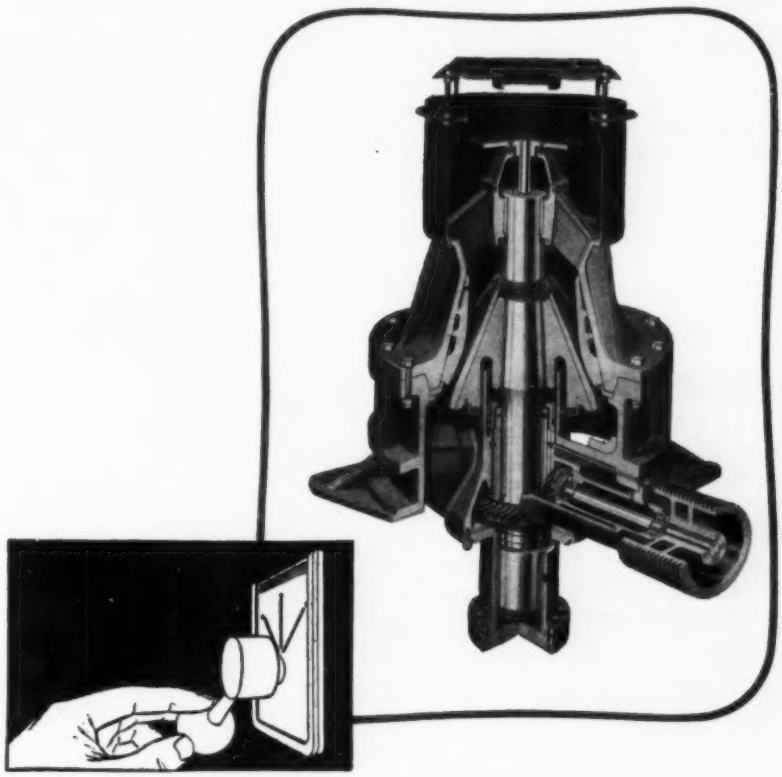
"Our National Transportation Policy"—John J. Allen Jr., Under-Secretary of Commerce for Transportation

12:30—Luncheon—Congressional Room

Arthur R. Alvis, N.A.L.I. vice-chairman of the board; president, Alvis Limestone & Concrete Products, Inc., Butler, Mo., presiding

"Our Changing World"—Robert M. Bridges, N.A.L.I. regional vice-president; Con-

(*Concluded on page 42*)



Just a minute...

that's all it takes one man to change settings in a *Hydrocone* crusher

Flip a switch . . . adjustment to precise product size is that easy. Compensation for wear and emergency unloading are also one-man, one-minute operations. Only Allis-Chalmers gyratory crushers offer this remarkable speed and convenience.

Bulletin 07B7145C tells the complete *Hydrocone* story. Get a copy from your A-C representative or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers Ltd., Box 37, Montreal, Quebec.

Hydrocone is an Allis-Chalmers trademark.

A-5929-CM

ALLIS-CHALMERS

World-Wide Cement News

1958 Brazilian Cement Output Up 15% from 1956 Production

During 1958 national cement production in Brazil reached 3,769,158 tons (including white cement). This figure shows an increase of 393,000 and 491,000 tons as compared with 1957 and 1956 respectively. Brazil, however, is still not self-sufficient in cement production, because the phenomenal increase in building activity in that country since 1956 has outstripped the capacity of the domestic cement industry.

In 1958 Brazil had 23 cement mills in operation, with four additional ones under construction, all located in 11 states and the Federal District of Rio de Janeiro. The cement industry is the first in the country to decentralize. Its rapid growth has been accomplished by generating finances, largely from within the country.

In the vicinity of Aleppo in the Syrian Region of the United Arab Republics a 300-t.p.d. cement plant is under construction by German Democratic Republic (East Germany) engineering firms. A 20-man staff of G. D. R. fitters and engineers on the site are training Syrian workers for eventual operation of the plant, which is scheduled to begin production next February.

A cement kiln described as the "largest in the Orient" was recently ordered by Tokuyama Soda Company from the Mitsuibishi Shipbuilding and Engineering Company, Tokyo. It was reported that the unit will have a capacity of 1,500 t.p.d.

According to *Pakistan Affairs*, there are seven cement plants in that country, which have a total production of 1,072,000 tons per year.

MANITOWOC Recuperators
Can Increase Rotary Kiln Output Up to 30%!

Manitowoc Type S Recuperator mounted on unit-fired kiln 11' x 400'.

- ★ *Rapid air quenching and cooling*
- ★ *Instantaneous ignition of air-fuel mixture*
- ★ *Increased production*
- ★ *Highest heat exchange efficiency*
- ★ *Greatly improved grindability*
- ★ *Substantial fuel savings*

Here's why Manitowoc Recuperators have improved rotary cement kiln performance in numerous world-wide installations:
1. The active cooling surface is engineered into the smallest possible area, allowing the cooling air to contact the clinker before it has begun to chill. 2. Pre-heated air travels the shortest possible distance, reducing heat loss. 3. Heat loss through radiation is almost eliminated. 4. Pre-heated secondary air volume contacts the primary air-fuel mixture in a highly turbulent condition, assuring instant ignition.

See how Manitowoc Recuperators will increase your kiln output. Write today for this informative catalog.

MANITOWOC SHIPBUILDING, INC., *Manitowoc, Wis.*
(A subsidiary of The Manitowoc Company, Inc.)

Enter 42 on card, page 167

N.L.I. Convention Program

(*Continued from page 38*)

sumers Co., Div. of Vulcan Materials Co., Chicago, Ill.

Afternoon Session
Federal Room
2:30

Paul W. Seitz, N.C.L.I. director; vice-president, May Stone & Sand, Inc., Fort Wayne, Ind., presiding

"Future Highway Programs"—Cong. Gordon H. Scherer

"Some Aspects of the Amended Taft-Hartley Act"—Stuart Rothman, general counsel, National Labor Relations Board

"Our Nation's Highways"—Ellis L. Armstrong, Commissioner of Public Roads of the Department of Commerce

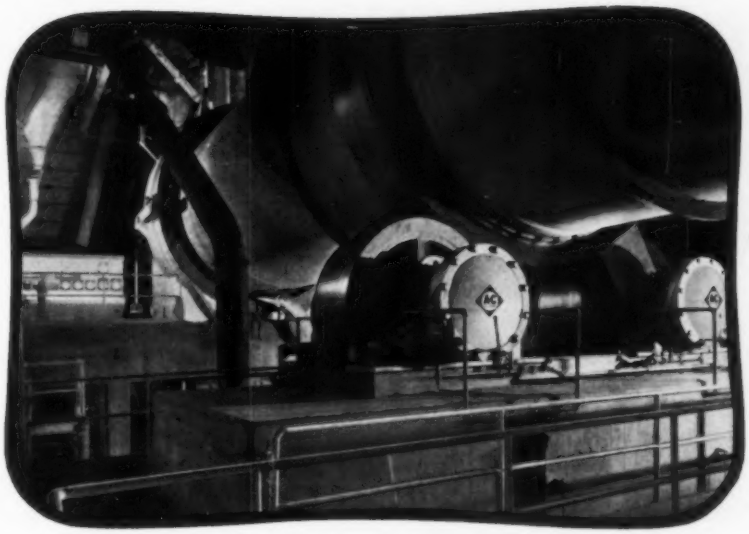
"Tax Developments in 1959 of Interest to the Limestone Industry"—John T. Sapienza, Covington & Burling, N.L.I.'s counsel

Reception and Banquet

6:00—Reception—Congressional Room
7:00—Annual banquet—Presidential Ballroom

W. L. Bryan and Thomas E. Lalley, presiding co-chairmen

Address—The Hon. Allen J. Ellender Jr., senior senator from Louisiana



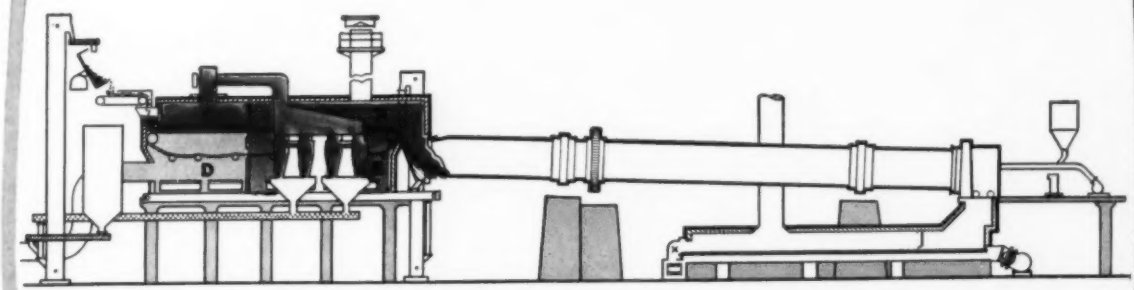
ACL pellet process cleans up cement making

Pelletizing of raw materials makes possible the dust-free operation of the *ACL* "double-pass" traveling grate system.

Along with clean production, making cement with pellets affords a barrel of bonus benefits — product reclamation, maximum burning efficiency, power savings, small space requirements.

How *ACL* "Double-Pass" System Works — In first pass (A to B) 1800° gas from kiln partially calcines feed in section nearest kiln. Gas temperature is reduced to 500°. Cyclones reclaim air-borne dust. In second pass (C to D) green pellets are dried and heated to about 500°. Gas stripped of heat and dust is exhausted in a mere wisp.

For the complete story, see your A-C man or write Allis-Chalmers, Industrial Equipment Division, Milwaukee 1, Wisconsin. In Canada, write Canadian Allis-Chalmers, Ltd., Box 37, Montreal, Quebec.



ACL is an Allis-Chalmers trademark.

ALLIS-CHALMERS

A-5930-CM

15 Winners Listed by N.L.A. In 1958 Safety Competition

FIFTEEN awards for injury-free operations have been made in the 1958 National Lime Association's Safety Competition, conducted by the U. S. Bureau of Mines. This is six more than were awarded in the 1957 competition.

Certificates of Achievement in Safety are granted by the National Lime Association to each competing lime plant that operated throughout 1958 without a lost-time disabling work injury. The award-winning plants operated 1,919,835 man-hours, or 24 percent of the total worktime among the 45 competing operations.

Winners in Group A—quarries with calcining plants working 100,000 man-hours or more—are as follows:

Genoa plant, Genoa, Ohio, United States Gypsum Co., 404,154 man-hours.
Galloway plant, Galloway, Mo., Ash Grove Lime and Portland Cement Co., 266,612 man-hours.
Millville plant, Harpers Ferry, W. Va., Jones and Laughlin Steel Corp., Blair Limestone Division, 136,409 man-hours.
York plant, York, Pa., National Gypsum Co., 132,548 man-hours.

Winners in Group A2—quarries with calcining plants working less than 100,000 man-hours—are:

Utah plant, Tooele, Utah, Material Service Corp., 57,822 man-hours.
Manitowoc plant, Manitowoc, Wis., Rockwell Lime Co., 47,612 man-hours.
Nelson plant, Nelson, Ariz. U. S. Lime Products Div., Flintkote Corp., 20,000 man-hours.

In Group B—underground mines with calcining plants—the following were winners:

Peerless Rotary plant, Ste. Genevieve, Mo., Mississippi Lime Co., 277,927 man-hours.
Hannibal plant, Hannibal, Mo., Material Service Corp., 96,128 man-hours.
Quincy plant, Quincy, Ill., Material Service Corp., 49,763 man-hours.

In Group C—calcining plants only—the following operations won no-lost-time awards:

Thornton plant, Thornton, Ill., Material Service Corp., 145,885 man-hours.
South Chicago plant, Chicago, Ill., Material Service Corp., 92,535 man-hours.
Springfield plant, Springfield, Mo., Ash Grove Lime and Portland Cement Co., 76,463 man-hours.
Ludington plant, Ludington, Mich., The Dow Chemical Co., Ludington Division, 76,002 man-hours.
Buffalo plant, Buffalo, N. Y. Kelley Island New York Corp., 59,975 man-hours.

The safety record at all plants enrolled in this 1958 N.L.A. safety competition was the *best in the 24 year history* of the contest. The frequency rate of 12.584 injuries per 1,000,000 man-hours of exposure to hazard was 20 percent less than the 15.762 rate in 1957, and was almost 50 percent lower than the 24-year average rate of 24.917.

The severity rate of 781.554 days lost per 1,000,000 man-hours was 62 percent lower than the previous year's rate of 2,037.398 and 75 percent less than the average 24-year rate of 3,113.321. The Mines Bureau report stated that 36 (80 percent) of all competing lime plants, had severity rates lower than the average rate for the competition.

The 1958 competition recorded 8,026,318 man-hours of operation. During this worktime there were 4 permanent partial and 97 temporary total injuries—a total of 101 lost-time disabling work injuries. The total loss in time resulting from these injuries was 6,273 days, the *lowest since the start of the competition in 1935*.

Of the four groups into which the competing plants are classified, the severity rate was lowest for Group C, calcining plants only, and highest for Group A2, quarries with calcining plants working less than 100,000 man-hours. The frequency rate was the highest for Group A2, quarries with calcining plants working less than 100,000 man-hours, and lowest for Group A1, quarries with calcining plants working 100,000 man-hours or more.

Of the 45 plants competing, 36 had participated in the 1957 competition. Comparison of the injury experience at these plants in both years shows that the frequency and severity rates were improved. The injury experience at a group of five lime plants enrolled in the competition since 1935 showed drops in both injury-frequency and injury-severity rates over the five-plant record in 1957, and both rates were under the 24-year average for these plants.

Burns caused the greatest number of injuries (23) during the 1958 competition. They accounted for 22.8 percent of all injuries. Thirteen injuries were charged to handling materials other than rock and 13 to falls of persons. The three next most severe causes of injuries resulted from haulage, falling objects, and machinery.

The most severe injuries came under the haulage classification where average loss was 280.9 days.

The 1958 injury-frequency rate for the nation's lime industry is available only in an estimated figure of 21.7, and since the annual record of the National Lime Association Safety Competition was 12.6, it is evident that competing plants have better safety records than others.

Any plant producing quick or hydrated lime or dead-burned dolomite, all or part of which is sold commercially, is eligible to enter this National Safety Competition. Applications for enrollment are available from the Branch of Accident Analysis, Division of Safety, Bureau of Mines, Interior Building, Washington 25, D. C.

Safety Measures Paid Off For Lehigh Portland Cement

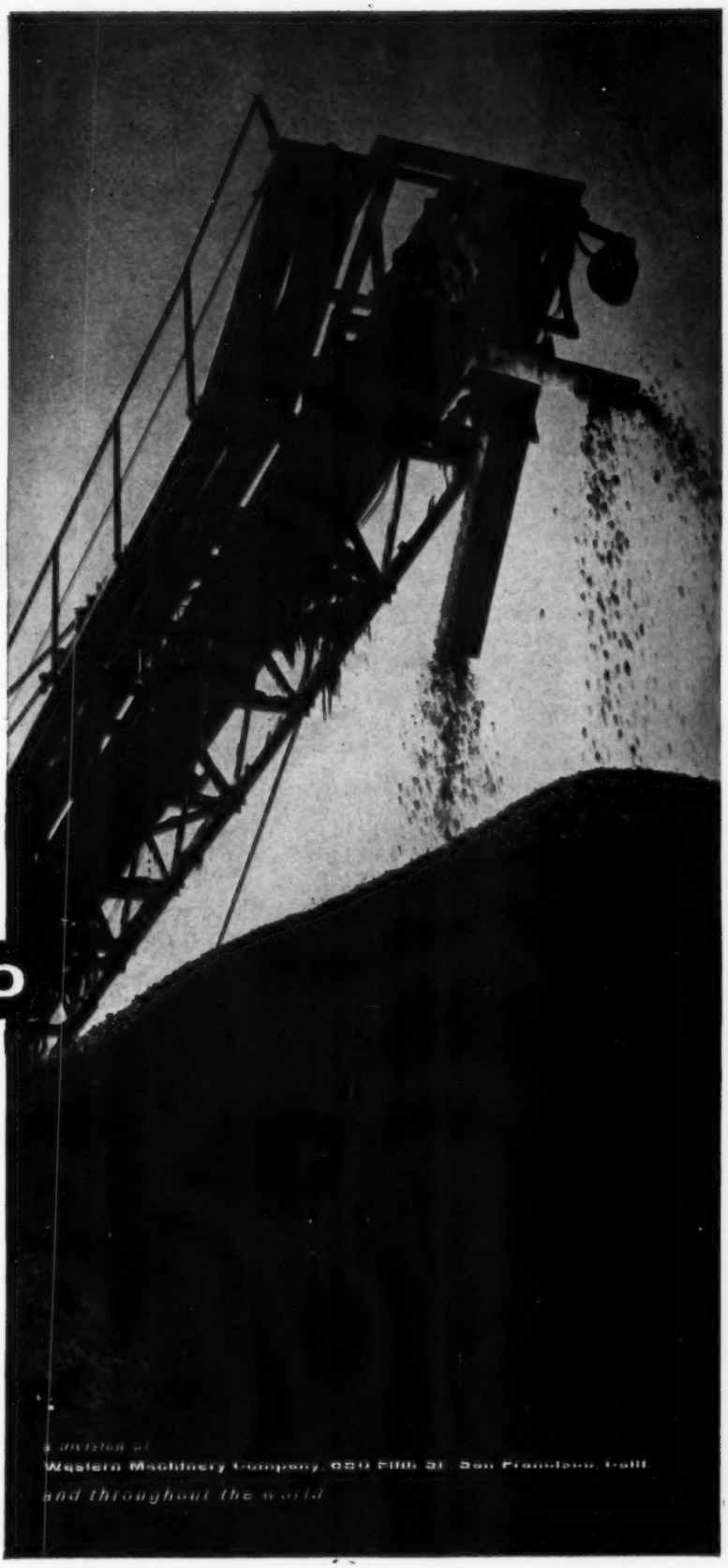
A recent copy of the *Lehigh News Conveyor*, published by the Safety and Welfare Department of the Lehigh Portland Company, carried a timely item labeled "Near Miss." We quote:

"While a drop-ball crane at a Lehigh plant was being operated with ball raised, the pin holding the ball suddenly sheered off. It flew downward between the screen guard and cab roof and through the crane's Plexiglass windshied, glanced off the operator's chest, and hit his elbow. Fortunately, the Plexiglass windshield, installed as a safety measure, absorbed the brunt of the impact.

"To prevent a recurrence of the accident, the drop-ball now is held in place with a bolt and cottered nut instead of a pin and cotter key. Also, the guard will be extended to the cab, and the windshield will be 3/16-in. thick Plexiglass, instead of the former ⅛-in."

MORE AND MORE THE ANSWER TO LARGE VOLUME SPECIFICATION AGGREGATE AT LOW COST IS

WEMCO



More often than not an analysis of an aggregate production problem today will come up with WEMCO as the sound solution.

The reason: WEMCO's near-20 years of experience in the development of equipment and methods, aiding operators to keep pace with increasing volume demands and stricter specifications.

WEMCO equipment for preparation, beneficiation and handling of aggregate is at work in hundreds of installations.

We'll be happy to discuss your operation in terms of profitable steps for the future.

FIRESTONE'S 24-HOUR TIRE SERVICE
helps you make bigger profits on lower bids!

Firestone *Giant Tire Service* keeps equipment working around the clock

Firestone's *Giant Tire Service* puts a Firestone off-the-highway Tire Expert on your job *whenever* you need him. With his completely equipped service truck, he'll handle all your tires from the biggest to the smallest. He'll check your tires regularly for proper inflation and spot potential trouble areas before they develop. Combine Firestone's Giant Tire Service with Firestone off-the-highway tires to bring down tire costs. There's a tubeless or tubed tire built with Firestone Rubber-X, the longest-wearing rubber ever used in Firestone tires, for every construction job. Call your Firestone Dealer or Store about Firestone's Giant Tire Service today.

Rock Grip Excavator® Wide Base Rock Grip Excavator

When ordering new equipment always specify Firestone tires.

FIRESTONE OFF-THE-HIGHWAY TIRE SERVICE IS AS NEAR AS YOUR PHONE!

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Colorado, Denver	AC 2-8676
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Miami	OX 1-8980
Georgia, Atlanta	CE 7-1531
Hawaii, Honolulu	6-3641
Illinois, Chicago	WA 2-1515
Peoria	7-7721
Indiana, Indianapolis	ME 7-5461
Iowa, Des Moines	AM 5-0395
Kansas, Kansas City	HA 1-5542
Wichita	AM 5-4646
Louisiana, New Orleans	JA 5-9227
Maryland, Baltimore	PL 2-3500
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Michigan, Detroit	WO 3-1060
Grand Rapids	GL 1-2911
Minnesota, Minneapolis	ST 9-2466
Missouri, St. Louis	PE 1-6880
Nebraska, Omaha	OR 4114
New Jersey, Newark	MA 2-6250
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Buffalo	KE 8803
New York	PL 7-6200
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Ohio, Akron	JE 5-4925
Cincinnati	PA 1-6816
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Columbus	AM 7-6333
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Philadelphia	SA 7-2600
Pittsburgh	MO 1-2100
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San Antonio	CA 7-7375
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Washington, Seattle	MA 3-5474
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Firestone

BETTER RUBBER FROM START TO FINISH

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Enter 46 on card, page 167

'58 Blast-Furnace Slag Output High Despite Steel Slowdown

Shortages of blast-furnace slag at many operations in 1958 resulted from cutbacks in the steel industry, causing processors to dig deeper into rapidly depleting slag banks in an attempt to meet the demand.

Over 28 million short tons of processed iron blast-furnace slag sold for more than $45 million, a decline of 18 percent in tonnage and 13 percent in value, compared with 1957. Because of greater stockpile utilization, more slag was processed than the furnaces produced in 1958. Statistics were compiled from a canvass conducted by the National Slag Association in co-operation with the U. S. Bureau of Mines. Included are the production figures of 40 companies operating 58 air-cooled slag plants, 15 plants processing granulated slag, and 23 plants producing expanded slag.

Production of screened air-cooled slag, the major type, declined 19 percent to 20 million short tons, valued at $34,000,000. Of this total, 18,000,000 short tons, or about 90 percent, was used as railroad ballast, aggregate in portland cement concrete construction, bituminous construction of all types, and miscellaneous highway and airport construction. Other principal uses for this type of product were in manufacturing concrete block, in mineral wool, and as a roofing aggregate.

Unscreened air-cooled slag output totaled 1,400,000 short tons, valued at $1,200,000—decreases of 35 and 17 percent respectively, compared with the 1957 figures. About 90 percent of this material was used as aggregate in highway and airport construction.

Granulated slag output of 3,500,000 short tons in 1958 was 22 percent less than reported in 1957. Manufacture of hydraulic cement required 56 percent of the granulated slag produced as a raw material; 33 percent was used in road construction; and the remainder was used for concrete block manufacture, in soil conditioning, and for miscellaneous products.

Production of expanded slag reached a record output of nearly 3 million short tons in 1958, valued at a record $8,600,000. The main applications for this type of product were for aggregate in concrete block and lightweight concrete.

Iron blast-furnace slag was produced in 15 states, nearly two-thirds in the steel centers of Ohio, Pennsylvania, and Alabama, and the remainder in California, Colorado, Illinois, Indiana, Kentucky, Maryland, Michigan, Minnesota. New York, Tennessee, Texas, and West Virginia. Pennnsylvania led all states in both tonnage and value in 1958.

Postma Concerns Acquired By Grand Rapids Gravel

Assets and equipment of Postma Gravel Company and Postma Equipment Company, Grandville, Mich., were recently acquired by the Grand Rapids Gravel Company of Grand Rapids, Mich.

H. F. Postma, the former owner, who has been in the gravel business for 30 years and in the ready-mix concrete business for about 12 years, retains title to company land and buildings which have been leased to Grand Rapids Gravel. The Postma Equipment Co. sale included a fleet of 80 trucks and concrete mixers.

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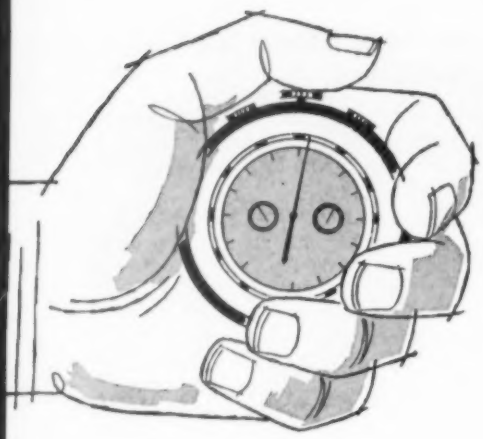


SECONDS SAVED

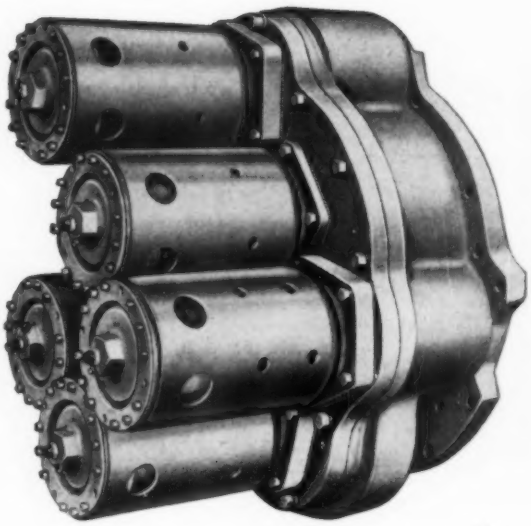
add up fast to give you ...bigger production ...bigger profits

Power-shift transmission on L-W Tournatractor® saves shifting time

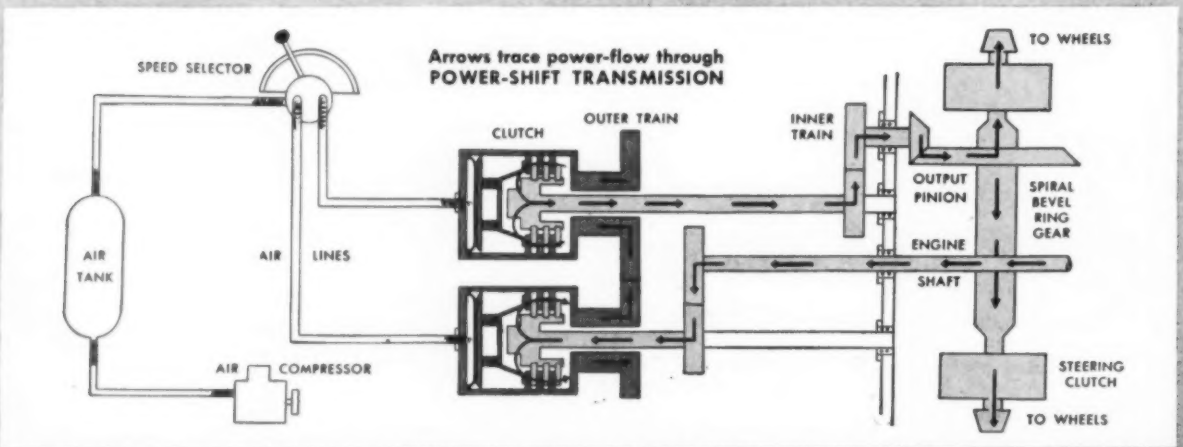
You can save as much as 80 minutes per 10-hr. day in your pit-tractor operations with instant shifting provided by Tournatractor's power-shift transmission.

This transmission is operated by air clutches for fast, efficient gear changes. Mounted individually on the ends of the gear shafts, the clutches engage and release in proper combinations through the operation of a simple selector lever. It requires little operator effort.

LeTourneau-Westinghouse power-shift transmission gives you non-stop, instantaneous speed-selection and high reverse speeds. There is no need to depress a clutch foot-pedal . . . no double-clutching . . . no meshing of one gear against another. With quick movement of the small speed selector, operator transfers power instantly from one gear ratio to another . . . with no gear clashing, no chance of locking out-of-gear. It gives faster pickup for drifting a load when dozing, and for pushing or pulling . . . gets more work done in less time!



Air-actuated transmission clutches save seconds — increase production. Each of the five 7" multiple-disc clutches in L-W Tournatractor transmission has 290 square inches of positive gripping surface. These heavy-duty clutches engage and release in proper combinations at the touch of a control lever. To make clutch adjustments, all you do is loosen a few Allen-head screws and turn adjusting ring "in" or "out." Transmission gears are fully enclosed and operate in a bath of oil. Lubrication points are conveniently located for quick, easy accessibility.



Torque converter saves seconds thru faster, more efficient operation

With Tournatractor's highly efficient single stage torque converter you get the equivalent of an infinite number of gear ratios within any gear range. It insures effective application of maximum horsepower at all times, over the complete speed range from 0.0 to 17.2 mph.

The LeTourneau-Westinghouse torque converter is a low-pressure unit, simple, and trouble-free. It has a single impeller, single turbine, and single reactor. Because it operates at low pressure, it is easy to keep the system sealed for lower maintenance.

Torque converter smooths out the shock of changing gears. It automatically balances load and torque, making gear selection less critical. Maximum efficiency is secured at all times by all of your operators. It automatically adjusts the speed ratio for more power, more speed, as needed. It provides you with better performance at all times in all your pit-tractor operations . . . dozing blasted rock on shovel clean-up, maintaining stockpiles, pushing gondolas, pulling other equipment, or maintaining haul-roads.

Ask for more information

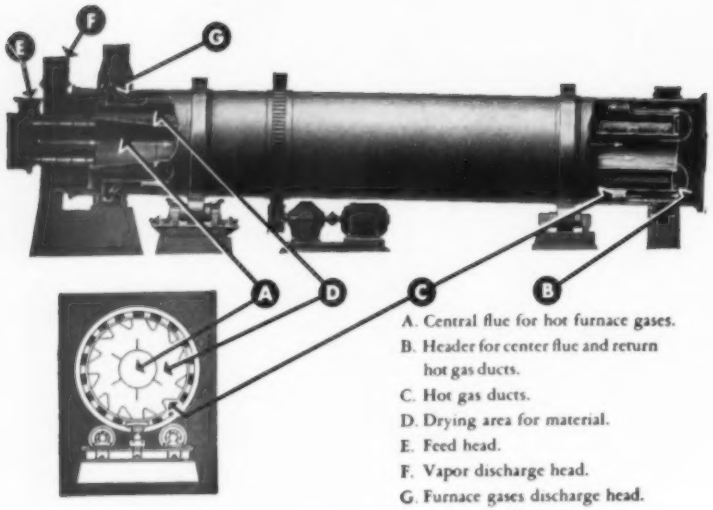
To save seconds that add up fast for greater work-capacity and bigger profits, it will pay you to look further into Tournatractor. Write LeTourneau-Westinghouse Co., Box 240, Peoria, Illinois for free 16-page Tournatractor Bulletin. *Ask for a demonstration on your job.* See why this high-speed, 218-hp, rubber-tired tractor has faster acceleration, better maneuverability, lower maintenance, to give you the speed and mobility you need in your pit operation.

CT-1888-M-2

LeTOURNEAU-WESTINGHOUSE COMPANY, PEORIA, ILLINOIS

A Subsidiary of Westinghouse Air Brake Company

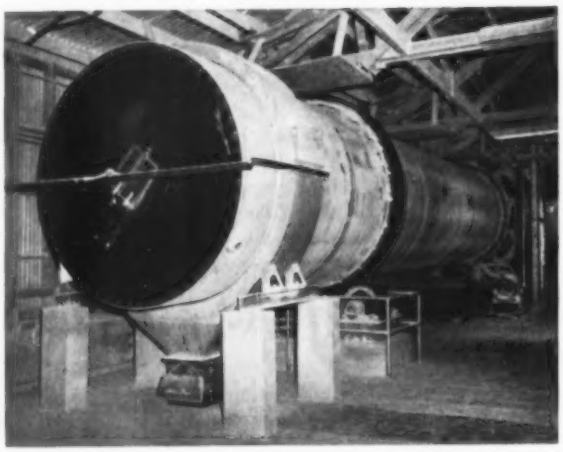
Where quality is a habit



A. Central flue for hot furnace gases.
B. Header for center flue and return hot gas ducts.
C. Hot gas ducts.
D. Drying area for material.
E. Feed head.
F. Vapor discharge head.
G. Furnace gases discharge head.

Ruggles-Coles INDIRECT-FIRED DRYERS and HEATERS

- Dry without contamination from combustion gases, regardless of fuel.
- Minimize auxiliary dust collection when handling fine precipitates and filter cake.
- Heat pulverized materials for process work.
- Collect vapors at high concentration.
- Available fabricated with heat and corrosion-resistant metals.



104″ diameter by 65′ long Ruggles-Coles Indirect Dryer removing moisture from washed and filtered Kaolin clay at Gardner, Ga., plant of Mineral and Chemical Corporation of America, Edgar Division.

Write for complete specifications. Ask for Bulletin AH-438-8

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Belgian Firm Develops Plastic For Conveyor Roller Bearings

The use of super-polyamide plastics for ball and roller bearings is being developed by Roll, Societe Anonyme, a plastics firm of Herstal, Liege, Belgium. At this time, according to the New York *Journal of Commerce*, a special use of the material is being developed for rollers for conveyor belts in mines and factories.

The super-polyamides are specially treated to produce automatic lubrication. It is reported that the wear is very considerably less than with the use of steel rollers.

S. D. Cement Plant Profits Aid State Road Program

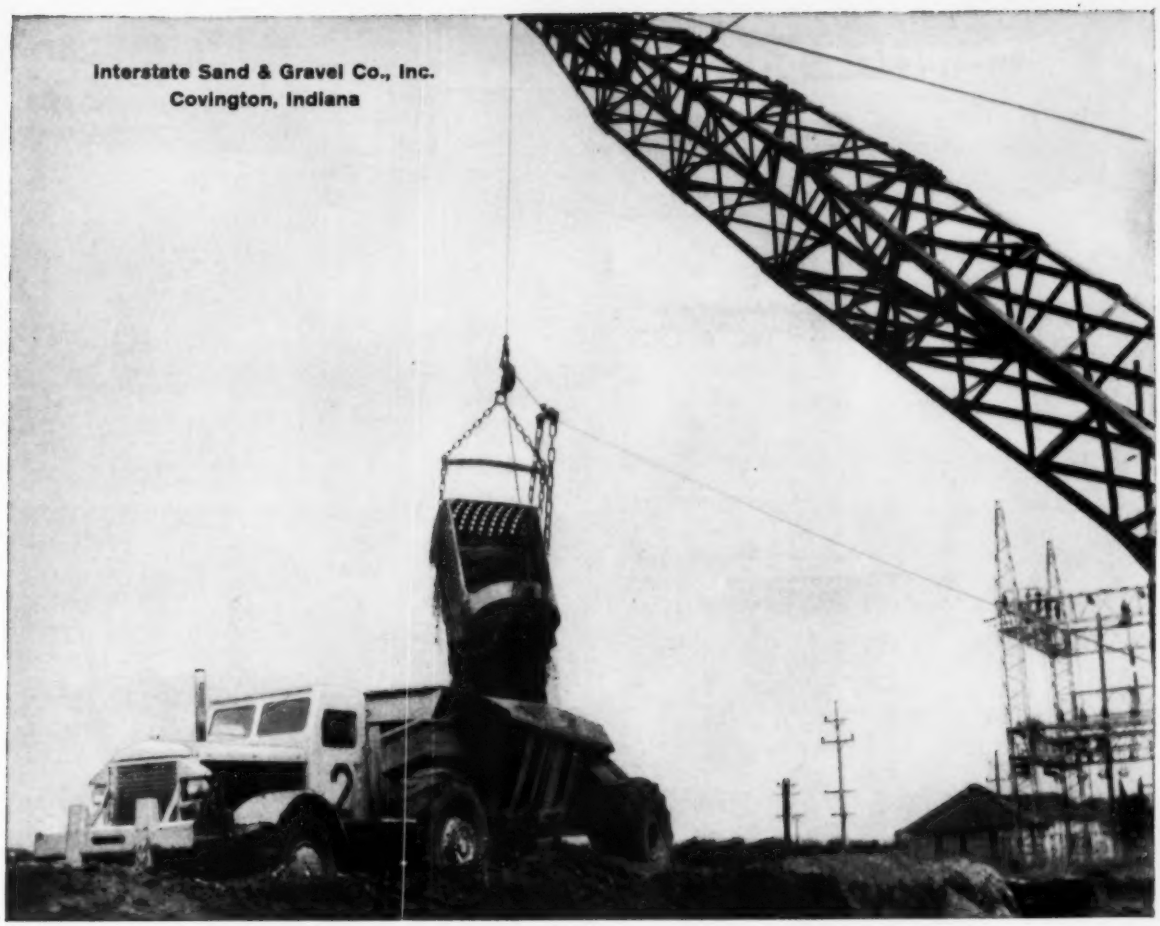
In response to a request from Governor Ralph Herseth, the commission in charge of the South Dakota Cement Plant has agreed to transfer $500,000 to the state highway department.

Legislation passed in 1959 authorized the transfer of $2,000,000 from the cement plant profits to the secondary road fund. The commission had already turned over $1,500,000 to the department.

Profits of the South Dakota Cement Plant in 1958 were $3,532,132. In addition, the commission has $1,200,000 invested and more than $1 million in accounts receivable, it was reported.

Canadian cement shipments in September continued a slight rising trend. Factories shipped or used 746,530 tons, 1.2 percent above the 737,622 tons the same month last year, according to the Canadian Bureau of Statistics. (August and first eight months figures appeared in PIT AND QUARRY, November, 1959, p. 32.)

St. Lawrence Cement Company has announced plans for the construction of a new cement distribution station in southeast Ottawa. The $250,000 installation is expected to be completed and in operation by spring of 1960. Both bulk and bag cement will be available.



7 Years Without Overhaul— Using Cities Service C-300 Motor Oil!

Only 1 quart of makeup oil every 100 hrs.!

The performance cited for this truck, using Cities Service C-300 Motor Oil, is not the random guesswork or wishful thinking of an optimistic maintenance supervisor.

At Interstate Sand & Gravel Company, this performance is a matter of record, carefully detailed under one of the finest systems of preventive maintenance in the sand and gravel business.

This painstaking records system and the outstanding performance it reveals is one of the compelling reasons why Interstate has relied exclusively upon Cities Service products for all lubrication during the past ten years.

Far from an isolated case, the truck above actually typifies the type of results Interstate has achieved with all of its equipment. Take the 2½-yard dragline in the picture, for example. Using Cities Service C-300 Motor Oil, this workhorse has piled up over eight years with no major overhaul required or anticipated!

If you're searching for an oil that is more than equal to prolonged heavy duty service . . . an oil that can be used in virtually *all* your diesel and gasolene engines . . . and above all, an oil that is competitively priced . . . get the facts about Cities Service C-300. Talk with a Cities Service Lubrication Engineer from the nearest office. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

Founded in 1903, Interstate has been working the same rich deposit since 1906. The deposit covers 450 acres and runs about 40 feet deep. Plant modernization after World War II brought switch to Cities Service Lubricants.

CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

General Electric announces . . .

NEW DRAW-OUT DESIGN

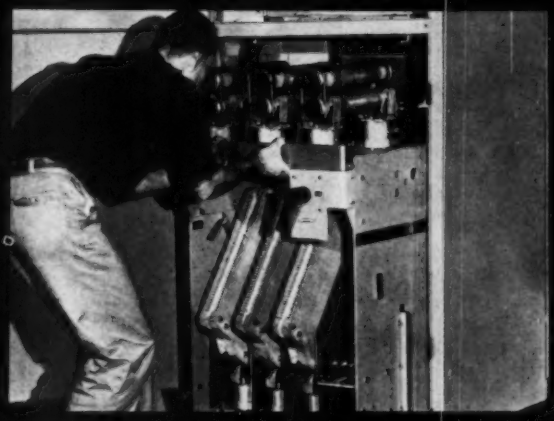
From General Electric comes the all-new draw-out Limitamp control—today's most advanced medium-voltage motor starter. Designed for the control of a-c motors rated 2300 through 4600 volts and up to 3000 hp, this new air-break starter has broad application throughout industry.

Since its introduction in 1941, Limitamp control has established a reputation for being first with the design features that add up to major user benefits. And, today's all-new Limitamp control follows this pattern with a host of design innovations that make for:

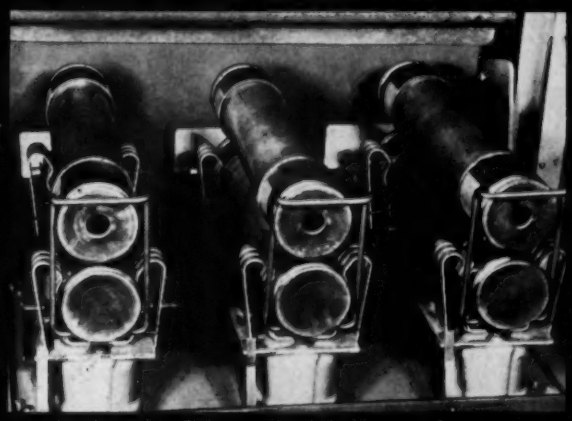
Faster installation: When you're ready to roll in the contactor—it can be done easily by one man. And, there are no connections to make—they are made automatically as the contactor rolls into place. There's plenty of space inside the panel for pulling the motor and power cables . . . and making the connections. And, with the new design, floor sills have been eliminated. This means no more grouting, no expensive cement work, simplified lineup with other panels.

Simpler, safer operation: One handle now controls the complete operation of connecting and disconnecting the starter from the bus and mechanically locking the high-voltage compartment door. A unique interlocking system protects the unit from misuse.

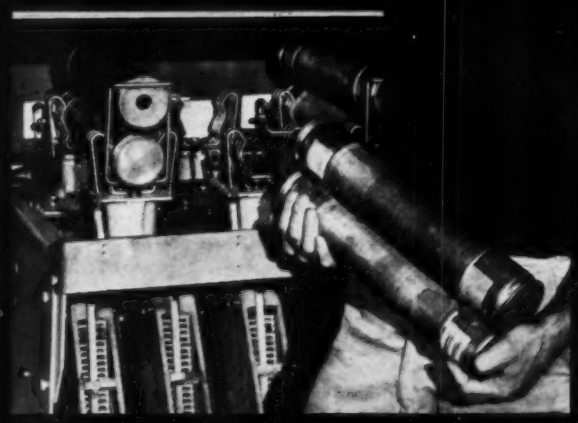
Superior protection: General Electric's new Limitamp



INSTALLS IN HALF THE TIME—Draw-out air break contactor, roomy isolated cable compartments, and increased working space help simplify installation.



LIMITAMP CONTROL IS ISOLATED AUTOMATICALLY—A unique shutter box isolates the starter from high-voltage power when the operating handle is turned to the off position.



INTERRUPTS FAULT IN FIRST ½ CYCLE—Fast-acting, current-limiting fuses interrupt circuit before short circuits cause damage to valuable motors.

NORMAL MAINTENANCE WITH CONTACTOR IN PLACE—All components, including the high-voltage contactor, can be maintained right in the control unit, with complete safety.

LIMITAMP* CONTROL

control utilizes fast-acting current-limiting fuses, ambient-compensated overload relays, and a high-voltage contactor to provide the most "positive" protection for your motors. Proved EJ-2 fuses interrupt a fault in the first ½ cycle, thus reducing damage to valuable motors. The performance of the completely coordinated design has been exhaustively tested in General Electric's high-voltage laboratory to provide the most reliable equipment for your application.

Easier maintenance: Even with these advanced design features, new Limitamp controls are simpler than ever to maintain. All components are accessible from the front for inspection and maintenance—without removing them from the enclosure. A special test circuit is built into each unit—permitting check-out operation before the unit is put into service.

For full information on all-new Limitamp motor control, contact your G-E Apparatus Sales Engineer or Agent today. Or write Sect. 783-10, General Electric Co., Schenectady, N. Y., for Bulletin GEA-6893. Industry Control Dept., Roanoke, Virginia.

*Reg. trade-mark of General Electric Company.

Progress Is Our Most Important Product

GENERAL ELECTRIC

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GET TOUGH

WITH LUKENS "T-1" STEEL
TRADEMARK

Where the going gets rough, versatile Lukens "T-1" steel fights back. For repair or modification of heavy duty equipment such as truck beds, chutes, bucket teeth and dozer blades, this special duty steel plate can be ordered from *warehouse stock* in a wide range of plate sizes and gages. Lukens "T-1" is the modern mining steel—you can work and weld it in the field as readily as in your shop. Its terrific resistance to abrasive impact—coupled with an extremely high yield strength—means fewer replacements and often greater payloads. That's why more and more equipment builders are using Lukens "T-1" to provide longer life in shovel buckets, trucks and other mining equipment. Remember to specify the extra-tough 321 min. BHN quality. For performance and application details, request our special booklet, "Lukens 'T-1' for Toughness." Address Manager, Application Engineering Dept., 0129 Services Bldg., Lukens Steel Company, Coatesville, Pennsylvania.

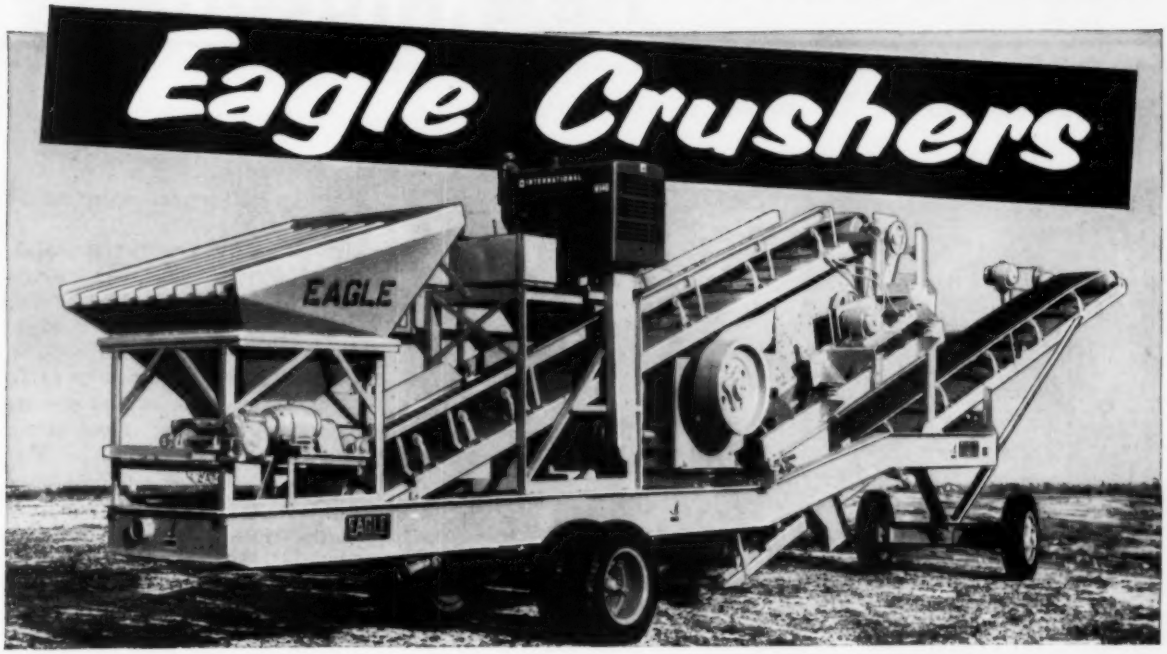
These warehouses can supply you with Lukens "T-1" steel plate...

Alabama, BIRMINGHAM 2, O'Neal Steel, Inc., P.O. Box 2623 • **California,** LOS ANGELES 54, Earle M. Jorgensen Co., P.O. Box 2358, Terminal Annex, 10650 S. Alameda St. • LOS ANGELES 33, The R. J. M. Company, 238-248 South Mission Rd. • **Illinois,** CHICAGO 8, Joseph T. Ryerson & Son, Inc., 16th and Rockwell Sts. • **Kentucky,** ASHLAND, Mansbach Steel Co., 19th St. and River Front • **Maryland,** BALTIMORE 2, Wm. G. Wetherall, Inc. 317 President St. • **New Mexico,** ALBUQUERQUE, Miller and Smith Mfg. Co., Inc., 500 Phoenix Ave., N. W. • **Ohio,** CLEVELAND 6, Mills-Wolf Steel Co., 12434 Cedar Rd. • **Oregon,** PORTLAND 4, J. E. Haseltine & Co., 115 S. W. Second Ave. • **Pennsylvania,** McKEES ROCKS, Follansbee Steel Co., 200 Bradley St. • **Quebec,** MONTREAL, Drummond, McCall & Co., Ltd. 930 Wellington St. • **Utah,** SALT LAKE CITY, Structural Steel & Forge Co., P. O. Box 300 • **Washington,** SEATTLE 4, Stack Steel & Supply Co., 500 Landers St. • SPOKANE 10, Union Iron Works, East 217 Montgomery Ave., P. O. Box 2135.

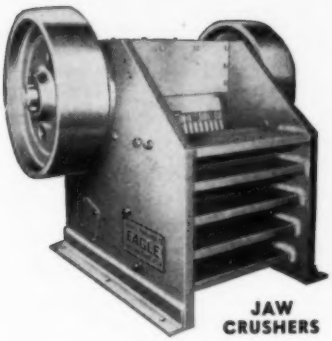
LUKENS (R)

PRODUCE MORE STONE AND GRAVEL WITH MOBILE

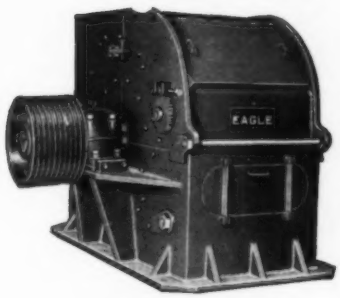
Eagle Crushers



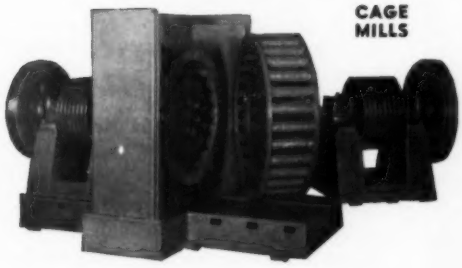
Eagle's new 6600 series portable jaw crusher—featuring low loading hopper —within easy reach of all makes of front end loaders. Variations in basic portable design provide for cage mills, hammermills and roll crushers.



JAW CRUSHERS



HAMMER-MILLS



CAGE MILLS

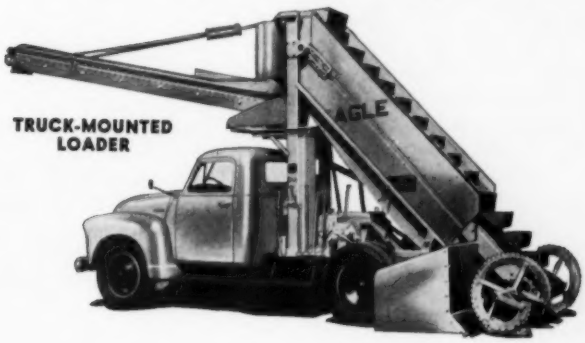
Eagle Crushers bear the characteristic marks of the experienced manufacturer—simple design, durable construction, ease of servicing. Eagle originated the one-piece, electrically welded frame—has pioneered in the field of portable, compact, crusher plants like the one above.

The range of models and sizes in the Eagle line meet most every need from primary crushing to super-fines. Expert engineering counsel available to help you with technical problems. Write—describing your needs. Representative will call if you desire.

EAGLE

JAW AND ROLL CRUSHERS, PORTABLE PLANTS, CAGE AND HAMMERMILLS, CONVEYORS, LOADERS

CRUSHER CO., Inc. GALION OHIO-U-S-A



TRUCK-MOUNTED LOADER

new machinery

● Development of a pneumatic conversion unit for installation on standard cement trailers by Sprout, Waldron & Company, Inc., makes it possible for truck owners to have the advantages of air delivery without obsoleting their mechanical or hydraulically driven auger units.

With the installation of a pneumatic conversion unit, the same truck can be used to deliver pneumatically or to unload directly into a dump sink. In addition, air handling makes possible the 'round the clock delivery of cement, without the bulk plant crew on duty. When a bin is equipped for air delivery, the truck operator can pull up at any time, couple the hose, and unload his truck at rates of up to 30 t.p.h. or more.

The Sprout-Waldron cement trailer conversion kit consists of an airlock feeder, blower, and hydraulic drive. When the complete kit is mounted on a trailer, it also includes a gasoline engine. If the blower is mounted on the tractor, the gasoline engine is unnecessary.

The cement trailer conversion unit offers the following features: simple, low cost installation; completely machined airlock with outboard bearings and wear-resistant, adjustable steel rotor tips; compact hydraulic drive; suitability for operation by gasoline, electric motor, or tractor power takeoff; and easy access for adjustment of the rotor blades. (351)

● Welding voltage is adjusted automatically during use of the new 300- and 400-amp., direct-current, diesel-engine-driven welders introduced by the Welding Products Division, A. O. Smith Corporation.

Only two indicators have to be set to operate either unit—one for electrode size, the other for desired current.

Welding range of the 300-amp. machine, Model A3000 W-DS, is 60 amp. minimum at 20 v. and 375 maximum amp. at 40 v. Welding range of the 400-amp. machine, Model A4000 W-DS, is 80 amp. at 20 v. and 500 maximum amp. at 40 v. Maximum open circuit voltage is 80.

Powered by Continental liquid-cooled diesel engines, the rugged units have generator frames that are laminated and welded together. The engines operate at a welding speed of 2,150 r.p.m., idle at 1,050 r.p.m. Manual idle control permits reduction of engine speed when welding is not being done. (352)

● Apcomite, a new explosive that combines the low initial cost features of processed ammonium nitrates with the handling ease and controlled shooting of regular explosives, is announced by the Austin Powder Company.

Apcomite incorporates specially-processed ammonium nitrate with a primer that eliminates the need of extra priming. It is said to produce greater explosive power per foot of loaded blast hole and to eliminate most shipping, storage, mixing, and materials handling problems.

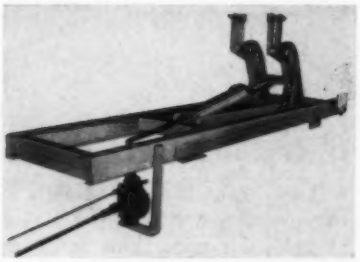
The new explosive is available in two types that are ready to load and ready to shoot. Apcomite 17 is for all normal usage, while No. 20A, with greater density, is for wet holes. Both types are furnished in 23G tubes in 5-in. diameters and larger. (353)

● Model HD-829, a single-cylinder, 8-in. underbody hoist that will haul and dump up to 18½ tons of material, is being introduced by Marion Metal Products Company. As a Class 12 hoist, it is designed for use primarily on tandem trucks and has ample capacity to do heavy-duty work in quarries as well as general hauling.

Features include large, strong lift arms made of cast alloy steel and heat treated to withstand wear and to give ample strength. The crosshead is made of heavy rolled steel. Extra strength has been built in the frame to resist bending and torsional

and equipment

for further information use card on page 167



stresses. The frame is all-welded with box-type cross members. Compared to the HD-8S hoist with a 20-in. stroke, the 829 will have a 22-in. stroke. (354)

● Raybestos-Manhattan's Ray-Man conveyor belt, with flexible construction and built-in stress compensation, is designed to take the sharp angle of 45-deg. idlers without ply or cover separation at the hinge line.

The deeper trough of belt conveyors with 45-deg. idlers permits increased loads up to 60 percent. Larger loads can be handled with belts of the same width as on 20-deg. idlers. With an increase in belt speed of 100 f.p.m. (50 f.p.m. in 42-in. belts and wider), a 6-in. narrower belt on 45-deg. troughing idlers will carry the same tonnage as the wider belt on 20-deg. idlers with no increase in horsepower.

Other advantages claimed for conveyor belt and 45-deg. idlers are less spillage, cleaner operation, and replacement cost. (355)

● Differential Company's side dump "Wagon Train on Rubber" is made up of a truck with one, two, or more wagons. These patented trains are built in two sizes, one for highway use with 15-ton capacity bodies, and a larger off-the-highway train with bodies carrying 25 tons each.

The on-the-highway truck and trailers in the illustration have identical bodies 8 ft. wide with 10-cu. yd. capacity, and will dump to either side. A solenoid valve on each body is controlled from the cab.

Design of the "Wagon Train on Rubber" provides low haulage cost per ton of payload. The cost reduction is accomplished in three ways: convenient method of dumping; increasing the load hauled by each driver; and increasing the ratio of payload to tare weight.

The illustration shows a payload of 33,600 lb. of stone being dumped from each body. The truck weighs 14,300 lb., for a ratio of payload to tare weight of 2.35 to 1. Each trailer weighs 5,200 lb.; the ratio is 6.46 to 1. (The ratio for the train increases with the number of trailers.) For the truck and two trailers shown, as the total payload is 100,800 lb., the total tare weight is 24,700 lb., and the overall ratio of payload to tare weight is 4.08 to 1. The "Wagon Train on Rubber" is powered by a 256-hp. V-8 gasoline engine.

The bodies are tilted to a steep 55-deg. dumping angle to clear sticky loads. Widely spaced body pivots and down-folding doors are features that place the dumped load clear of the tires for easy pull-away. The wide clear dumping gives added safety in dumping at the edge of a fill, since the tires can be 3 ft. inside of the edge and the side dumping will throw all the material down the bank slope.

Three bodies can be dumped in less than 30 seconds, and it is not necessary to bring the train to a full stop. The wedge-shaped doors knife cleanly through piled material.

The trailers closely follow the track of the truck on curves. On a 34-ft. radius curve the first trailer tracks only 6 in. inside the truck; the second trailer, 12 in.

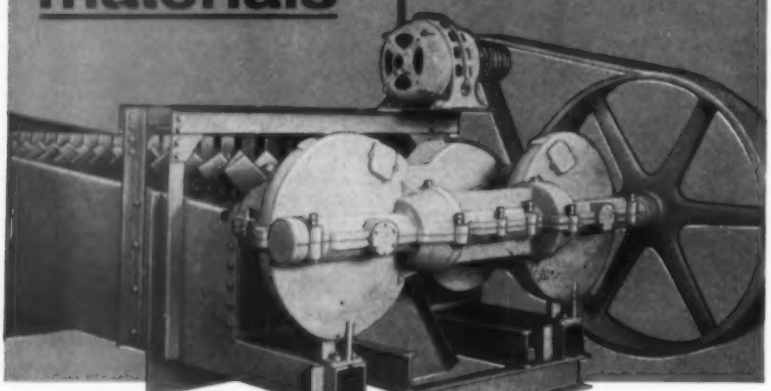
Since each trailer can swing around to a 75-deg. angle with the unit ahead, the train can turn around on a 40-ft. road by backing twice during the turn or on a 68-ft. road without backing.

The larger off-the-highway Differential trains are powered by diesel engines 300 or 385 hp. Alloy steel bodies are used to withstand loading by large shovels. (356)

High Capacities of clean materials

Developed from the world's first all-steel log washers built by McLanahan & Stone in 1894, these machines produce high tonnages of exceptionally clean materials—removing tough clay, soft rock and refuse with unequalled speed and economy • Available in Washmaster and Mudmaster styles.

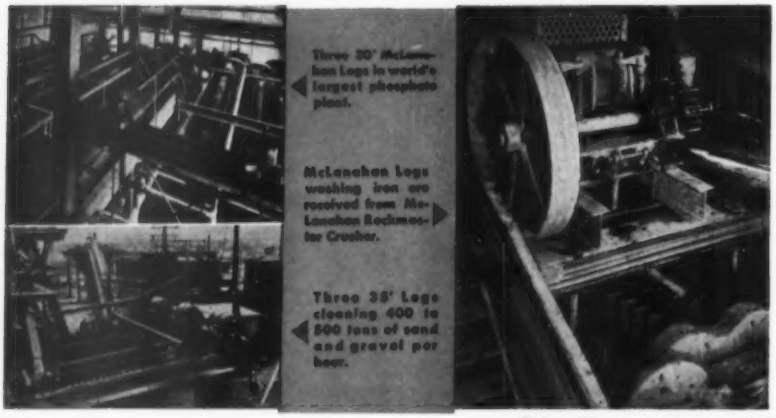
Write for Bulletins WLO-1155 and MM-90.



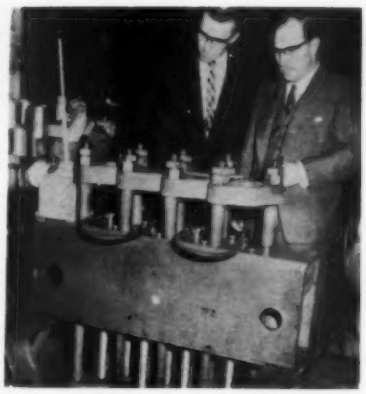
McLANAHAN SINCE 1835

LOG WASHERS

McLANAHAN & STONE CORPORATION
253 Wall Street, Hollidaysburg, Pennsylvania

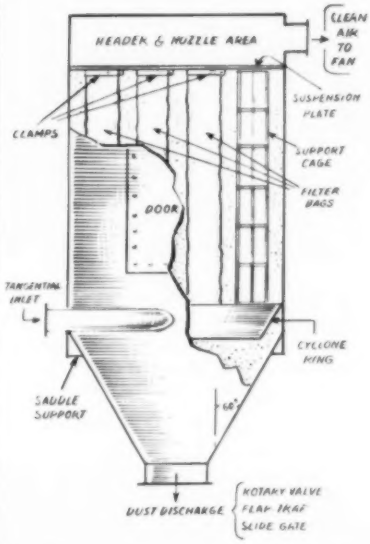

Three 20' McLanahan Logs in world's largest phosphate plant.
McLanahan Logs washing iron ore received from McLanahan Rockmaster Crusher.
Three 35' Logs cleaning 400 to 800 tons of sand and gravel per hour.

Enter 58 on card, page 167



• Lake Shore, Inc., has recently introduced a new hydraulic equalizer assembly for mine skips and cages for use with multiple ropes. The unit, used with Koepe-type hoists, automatically equalizes the multiple rope suspension.

According to Lake Shore engineers, the unit will compensate for a larger amount of variation in rope lengths than common types of linkage systems. **(357)**

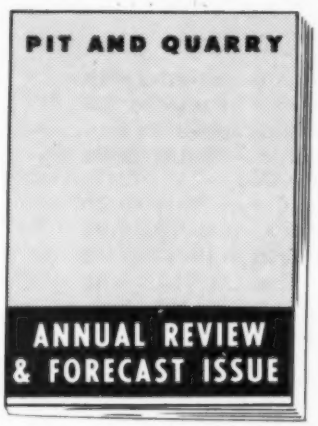


• No moving parts, constant air flow and pressure drop, and automatic filter tube cleaning are among the features of a new dust collector introduced by the Flex-Kleen Corporation. This dust collector is available in six standard sizes with 2,000 to 12,000 c.f.m., and can be suspended from the ceiling or mounted on the floor.

In operation, the unit receives dust-laden air through a tangential

3 BIG EVENTS

TO BE REPORTED IN THE JANUARY
ANNUAL REVIEW & FORECAST ISSUE
OF PIT AND QUARRY



1 43rd Annual Convention National Crushed Stone Association
February 22-24, 1960

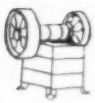
2 44th Annual Convention National Sand and Gravel Association
February 15-18, 1960

3 30th Annual Convention National Ready Mixed Concrete Association
February 15-18, 1960

Record Attendance Anticipated

With over 150 Exhibitors there will be intense competition for attention of plant operators.

To solve this problem place your sales message in the advertising pages of January Pit and Quarry and include your booth number if exhibiting.



The January issue will reach prospective equipment purchasers prior to the Convention and will contain:

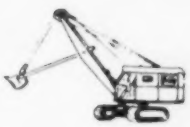
CONVENTION PROGRAM • NAMES OF EXHIBITORS & PERSONNEL
FLOOR PLAN OF EXHIBITS • LIST OF EQUIPMENT ON DISPLAY
PIT and QUARRY'S ANNUAL REVIEW and FORECAST SECTION
Special Exclusive Articles on important industry developments

Reserve space now in the year's best issue

ADVERTISING FORMS CLOSE December 15th

PIT AND QUARRY

431 SOUTH DEARBORN ST. • CHICAGO 5, ILL.



NOW!

A choice of transmissions

For All-Out Production...

TL-14 with FULL POWER-SHIFT TRANSMISSION

Exclusive single-lever speed and direction control!

You get more than just a full power-shift transmission with the TL-14 TRACTO-LOADER. You get a transmission that is controlled by ONE LEVER — not two or more levers or a combination of levers and foot pedals.

This means no stopping to shift to get into a higher gear. You go into and out of any forward or reverse gear "on-the-go"—from low to second or high instantly, while moving.

And you get a power-shift transmission that is equipped with a torque converter with a big 3.5-to-1 ratio of torque increase at full stall — more than any other loader its size. Means you get the job done — faster, easier — in toughest going.

If you are after all-out production at the pile, if your hauls are long . . . if loading work is scattered and you want to go from one job to another in a hurry — then the TL-14 with a full power-shift transmission can't be beat. A demonstration will convince you.

The TL-14 has MORE of everything! More Reach — dumps right into center of high body trucks. More Carry Capacity — 5,300 lb. More Breakout Force — 18,800 lb. More Power — 86 hp gasoline, 83 hp diesel. And there's a family of six buckets to choose from — 1 to 3 cu yd.

for a wheel loader

For All-Out Savings...
TL-14 with TRACTOMATIC TRANSMISSION
simple design • economical • power-operated

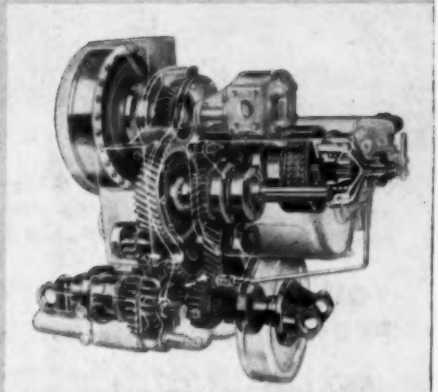
Now you can get a transmission that gives you the ease of operation you want at big savings. The optional TRACTOMATIC transmission for the TL-14 TRACTOLOADER is hydraulically operated and simple in design.

Because there are fewer parts and gears and only two clutches (easy to get at), the price and maintenance of the TRACTOMATIC is considerably less than a full power-shift transmission. This means a lower first cost for the TL-14 . . . lower upkeep, easier servicing throughout its life.

Extensive field tests prove that the TL-14 with a TRACTOMATIC transmission will perform as well or better than other loaders with full power-shift transmissions on short-haul loading and stockpiling.

If you want a good, reliable, easy-operating loader, you can really save money by choosing the TRACTOMATIC transmission for your TL-14. Ask your Allis-Chalmers dealer to show you what it can do. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wis.

FAST, EASY SHIFT — Operator just flips a lever on the steering column to go forward or reverse. Since the reverse speeds are 30 percent faster than forward, you get the extra back-away speed you want without shifting into a higher gear. To get this higher reverse on most other loaders, two separate levers would have to be moved.



HYDRAULICALLY OPERATED — Note the simple, compact design of the TRACTOMATIC transmission in this cutaway. Two multiple-disc clutches — just outside the transmission — are hydraulically actuated and share the work load. One is for forward, the other reverse. As one works, the other rests and cools — an important contribution to long clutch life. Both are accessible for quick adjustment.

AC

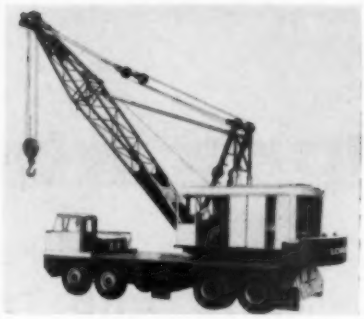
move ahead with ALLIS-CHALMERS

...power for a growing world

cyclone ring. Heavier materials are immediately dropped, preventing overloading of the filter tubes. The lighter materials are collected on the outside of the filter tubes. As the accumulation builds up, these tubes are intermittently flexed taut by sharp bursts of compressed air in a continuous series of sequences. This shake-off action, which can be adjusted as to duration and interval, cleanses the filter tubes constantly throughout operation. (358)

● The Thew Shovel Company introduces a 65-ton Lorain Model MC-760 Moto-Crane on a new, longer and stronger, 8 x 4 carrier, which features Power-Set outriggers, Shear-Ball connection, and square-tubular-chord boom.

The carrier is constructed with a sturdy welded box-section chassis frame 22 in. deep. The 230-in. wheelbase provides 14 ft. between the second and third axles. The unit travels up to 37.6 m.p.h. and has

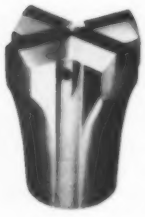


air brakes on all eight wheels. Front axles are mounted with solid equalizer beams. The two rear driving axles are double reduction type with Hi-traction differentials. Final reduction is through planetary wheel hubs.

Sections are easily added to the 40-ft. basic boom to give up to 170 ft. of main boom. (359)

Using 4-in ROPE thread Brunner & Lay Rok-Bits* on a 8- by 12-ft pattern to sink 40 ft holes in biotite granite, the Gainesville Stone Co. crews get an average of slightly better than 2 tons per lb of powder.

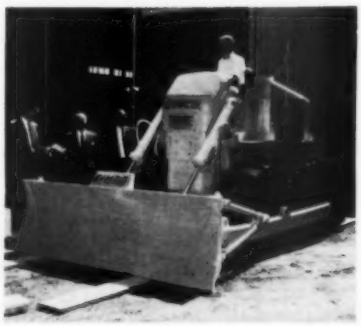
YOU, TOO, CAN BENEFIT BY THEIR TOP PERFORMANCE IN CHEWING OUT ROCK



For details on this and other difficult, low-cost Rok-Bit drilled jobs call our dealer, or nearest plant. Write for NEW complete catalog #759 on your company letterhead, stating your position. (*proved on every type of machine and job) Brunner & Lay, Inc., 9300 King St., Franklin Park, Ill. 77 progressive years. Plants and conversion shops: Albuquerque, Asheville, Birmingham, Dallas, Denver, Dorchester (Boston), Franklin Park, Long Island City, Los Angeles, Philadelphia, Portland, Sacramento, Seattle, Yardley (Spokane), Lachine, Que., Vancouver, B. C.

Brunner & Lay CARBIDE ROK-BITS • DRILL RODS
INTRASET STEEL • COUPLINGS, ADAPTERS, STRIKING BARS & SECTIONAL STEEL • Standard or ROPE thread.

Enter 62 on card, page 167

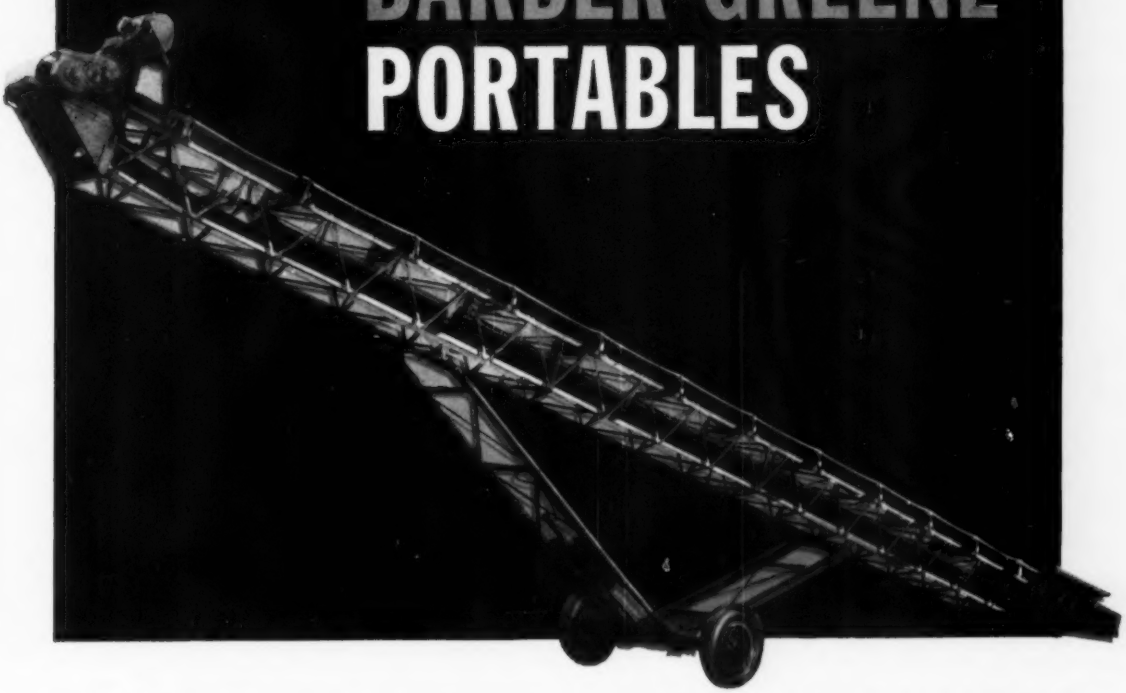


● The 103 line of crawler tractors, recently introduced by The Eimco Corporation, is a 100-hp. tractor series incorporating many design improvements. Production units in the 103 series will include a bare tractor, six models of dozers, and a front-end loader.

The 103's are built with unitized Stress Flow construction, whereby massive steel castings are molded to the shapes and stress patterns required for maximum strength and rigidity, without welds or bolts.

Another new feature is Eimco's Quadra-Torque, which, teamed with a heavy-duty torque converter and Unidrive transmission, permits four gear selections in either forward or reverse, allowing shifts from any speed or from forward to reverse and back again at any engine or tractor speed and load. The 103 also incorporates a self-cleaning air-cleaner. (360)

NEW HEAVY-DUTY BARBER-GREENE PORTABLES



Here's an all-new, heavy-duty portable conveyor line from Barber-Greene that's designed to handle sand, gravel, stone, cinders, chemicals, wet concrete, coal and other bulk materials at high capacity and lowest cost. Choose from a wide range of belt widths and lengths.

- **Maximum portability**—Sturdy V-type truck... single oversize pneumatic tires . . . wheels turn on tapered roller bearings. Convenient towing hitch allows unit to be towed over highway or readily moved from one yard location to another.
- **Rugged construction**—Sturdy Warren-type truss design gives maximum strength with minimum weight . . . unit handles large lumps and heavy loads in severest applications with a minimum of maintenance.
- **Easy alteration**—You can lengthen, shorten, alter to meet changing conditions quickly—at any time. Parts are readily available.
- **Choice of three drives—**
  Model PA-70 with Torque Arm Drive
  Model PB-70 with V-Belt Drive
  Model PC-70 with Lineshaft Drive
- **A complete line of portables**—Long, short, light and heavy-duty Barber-Greene Portable Conveyors, plus all conveyor accessories needed, are available to simplify and speed your handling of all bulk materials.

59-5-PO

Representatives in Principal Cities of the World

Barber-Greene BG

Main Office and Plant AURORA, ILLINOIS, U. S. A.

Plants in DeKalb, Illinois..Detroit..Canada..England..Brazil..Australia

CONVEYORS . . . LOADERS . . . DITCHERS . . . ASPHALT PAVING EQUIPMENT

WHICH 3 OF THESE USED EQUIPMENT BUYS IS BEST FOR YOU?

Only your Caterpillar Dealer offers you these three protected buys on used equipment. Which is best? That depends on how you want to use a unit and what you want to pay. Whatever you want, you'll find it in his lot.

BONDED BUY

1 **A "BONDED BUY"** on used Cat-built equipment is your safest buy. A bonded guarantee, up to $10,000, of satisfactory performance on *all* parts is given when you purchase a "Bonded Buy" used Cat-built machine.

2 **A "CERTIFIED BUY"** covers units of any make in good condition. This type of protection carries your dealer's written guarantee of satisfactory performance.

3 **A "BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

You *know* what you're buying from your Caterpillar Dealer. You'll find him listed in the Yellow Pages. Visit his Used Equipment headquarters for the best buys in the market!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

Enter 64 on card, page 167

● Fuel cells are the source of electrical power in this experimental tractor from the research laboratories of the Allis-Chalmers Manufacturing Company. The vehicle develops at least 3,000 lb. of drawbar pull.

The electricity that drives the tractor comes from 1,008 individual fuel cells, which are joined in 112 units of nine cells each. The 112 units are arranged in four banks and electricity can be taken from any combination of the banks.

A mixture of gases—largely propane—fuels the cells. The gases are fed through a system of tubing into the cells where they react in an electrolyte. A catalyst coating the electrodes of each cell aids the reaction.

The chemical reaction within the cells causes a direct current to flow through an external circuit which is connected by bus bar to a standard controller.

The overall reaction is the consumption of the fuel gases to yield water and carbon dioxide and produce a flow of electrons (direct current) through the external circuit.

The compact controller, measuring 8 by 11 by 21 in., regulates the electricity supplied to a standard 20-hp. motor. The controller permits the tractor driver to regulate speed or reverse the tractor's direction by moving two levers. Using the speed control, the operator places the four banks of cells in series or parallel, varying the amount of current going to the motor. To reverse the tractor, the driver moves the second lever, changing the polarity of the current flow to the motor. The gas supply is carried in tanks mounted in brackets on the tractor.

As a device which converts chemical energy to electrical energy —direct current—the fuel cell resembles other electric cells but has a considerably higher efficiency. Like all batteries, it consists essentially of electrodes and an electrolyte. Conventional storage cells store their energy in the electrode-electrolyte system within the cell, whereas the fuel cell can store no energy within the cell itself. In theory, a fuel cell can supply electric power as long as the fuel supply lasts. In the past, fuel cell performance left much to be desired because of the difficulties associated chiefly with unfavorable chemical reaction rates.

When the free energy of the reaction is converted directly into electric energy, as is the case in the fuel cell, there is no theroetical limitation on efficiency. It offers the possibility of producing electric power directly from a fuel at an efficiency of 90 percent. Because the fuel cell does not involve heat, it escapes the high heat engine energy losses.

In the fuel cell is seen a valuable energy conversion method through use of off-peak generator facilities to produce hydrogen and oxygen which can be stored, transported, and utilized at will in fuel cells.

(361)

Enter 65 on card, page 167 →

CATERPILLAR'S PROJECT PAYDIRT

PROJECT PAYDIRT* *pays off again*

NEW CAT D7 SERIES D TRACTOR

For higher production at lower operating cost

BY ANY comparison the new Cat D7 Series D Tractor is champ in its class. It packs 140 horsepower . . . matched with 80% more lugging ability than the previous model—for greater production. And it delivers this production at lower operating and maintenance costs. The payoff for you . . . increased performance that no other tractor in this power range can match.

Major improvements, developed by Caterpillar's Project Paydirt, affect the engine, power train and undercarriage. And the new Series D retains the exclusive Caterpillar Oil Clutch. It's time-tested; delivers up to 2,000 hours—one whole season—without adjustment.

For complete facts about the leader, see your Caterpillar Dealer. He's ready to give you the whole story on the new D7 Series D. And he'll arrange a demonstration on your job.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

* ***PROJECT PAYDIRT:*** Caterpillar's multi-million-dollar research and development program — to meet the continuing challenge of the greatest construction era in history with the most productive machines ever developed.

NEW ON THE D7 SERIES D

TURBOCHARGED ENGINE features 9% horsepower increase, 80% more tractor lugging ability. Optional in-seat starting is available. The payoff . . . more production!

DRY-TYPE AIR CLEANER removes at least 99.8% of all dirt and dust from engine intake air during every hour. Cleaner can be easily serviced in 5 minutes. Filter element can be re-used. The payoff . . . economical, convenient maintenance and longer engine life.

SERVICE-FREE TRACK ROLLERS, carrier rollers and idlers are lifetime lubricated. New load-carrying design increases roller life. The payoff . . . longer life, no on-the-job lubrication shutdowns.

PRESSURE-LUBRICATED POWER TRAIN insures complete circulation of filtered oil to transmission, bevel gear and pinion. To transmit increased power, power train components have greater strength. The payoff . . . longer gear life, trouble-free operation.

CATERPILLAR

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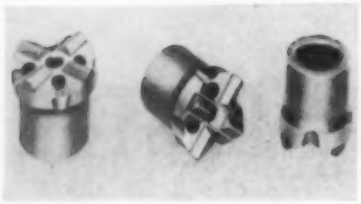
BORN OF RESEARCH
PROVED IN THE FIELD



● One-use carbide insert drill bits have been added to its line of CRD dust collecting bits by the Le Roi Division, Westinghouse Air Brake Company. Because of their low per unit cost, the new bits are intended to be thrown away when they are finally dulled.

Available in 1⅜-, 1½-, and 1⅝-in. sizes, the dust collecting bits are of the cross-type, five-hole design. They can be used interchangeably on the same ⅞-in. steel with Le Roi's all-steel one-use bits. A CRD 875 shim, also interchangeable for all three bit sizes, is used for easy bit removal.

The new bits can be utilized with any stoper, air leg, or hand sinker drill that uses the dust collecting principle. (362)

● International Harvester Company has introduced a new 230 series of off-the-highway heavy-duty trucks for mine and quarry operation and ready mix hauling. The series includes six basic models in both four-wheel and six-wheel design and offers gross vehicle weight ratings ranging from 46,000 to 73,000 lb.

Design features include diamond plate steel fenders, heavy-duty brush guard, double-channel heat-treated frame, and two new rear axles. Power steering is standard on all models.

Engine availabilities for both four-wheel and six-wheel models are the International Red Diamond 501 six, rated at 212 hp.; the International V-549 V-8, rated at 257 hp.; and the Cummins NH, HR, and NT series diesels. Both six-cylinders and V-8 power plants are offered with LPG fuel systems.

New rear axle on the standard 230 four-wheel model is rated at 35,000 lb. A new tandem rear axle, featuring a planetary double-reduction tandem and rated at 44,000 lb., is offered on the six-wheel F-230. (363)

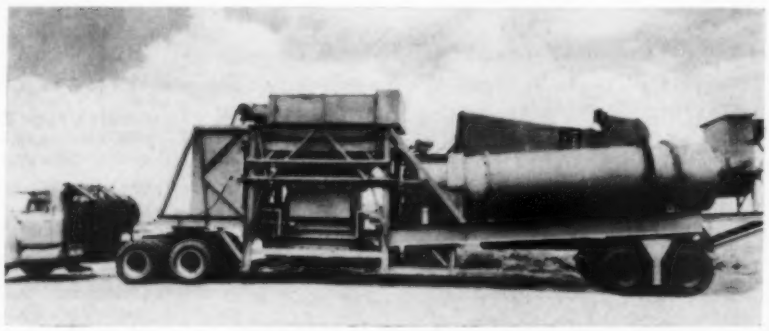
● Among the E-Line instruments which Leeds & Northrup Company recently introduced is the 8687 portable volt potentiometer. This instrument has two operating ranges — from 0 to 1.601 v. and 0 to 0.1601 v.—which cover most requirements in plant and laboratory applications.

Other features of the 8687 include a central window readout of two decades and slidewire, convenience of operation, and high accuracy and sensitivity. The high range has a limit of error of ±(0.05 percent + 30 uv) and the low range ±(0.05 percent + 3 uv).

In plant use, the instrument can be used to calibrate L&N pH meters, thermal converters, strain gauges, etc. Typical laboratory applications include measurements of temperature, pH, redox, contact potentials, plus calibration of d.c. ammeters, voltmeters, and other similar instruments.

The 8687 is housed in a metal case with a removable lid and carrying handle and has a durable vinyl finish. (364)

● Exceptional spreading ability is claimed for KPO No. 1, a fast-acting penetrating rust solvent produced by the Keystone Lubricating Company. Unusual wetting power enables this product to penetrate deeply and quickly into rust-frozen surfaces. Thus, rusted nuts and bolts can be separated and flanges, couplings, pulleys, and wheels can be removed from shafts easily. KPO No. 1 also has the necessary film body to lubricate and protect parts being disengaged. (365)



● Now available from the Standard Steel Corporation is a completely portable 3,000-lb. batch capacity asphalt plant, the Model TM-3000. Production capacities up to 120 t.p.h. are offered by this new plant.

Self-contained in its own trailer frame, the portable drying and mixing unit can be transported to any job location, and, with push-button erection, can be set up and producing within 8 hours. A built-in power hoist automatically raises the mixing unit from transport to operating position in less than 30 minutes.

Some of the features of this trailer-mounted plant are super-lift dryer with saw-tooth lifters; high-speed mixer; Simplex push-button batching control; positive control of liquid asphalt; complete accessibility to the mixer and other equipment; and a completely portable dust collecting unit. (366)

Enter 67 on card, page 167 →

GET THE MOST

MISSION HAMMERDRIL FOR HARD ROCK DRILLING

The Mission HAMMERDRIL® is a "bottom hole" pneumatic impact tool for high speed, low cost drilling through the hardest rock. The design makes for economy: there are only two moving parts in the high pressure tool, and only three moving parts in the low pressure tool. Impact parts are heat-treated, high alloy steel; moving parts are friction and wear resistant. You can use it on your present rotary rig with suitable compressor capacity. Mission HAMMERBITS® feature massive tungsten carbide inserts which can be *resharpened in the field.* The Mission HAMMERDRIL® is sold and serviced throughout the United States. Write for more information on the savings you, too, can expect when you buy the *most.*

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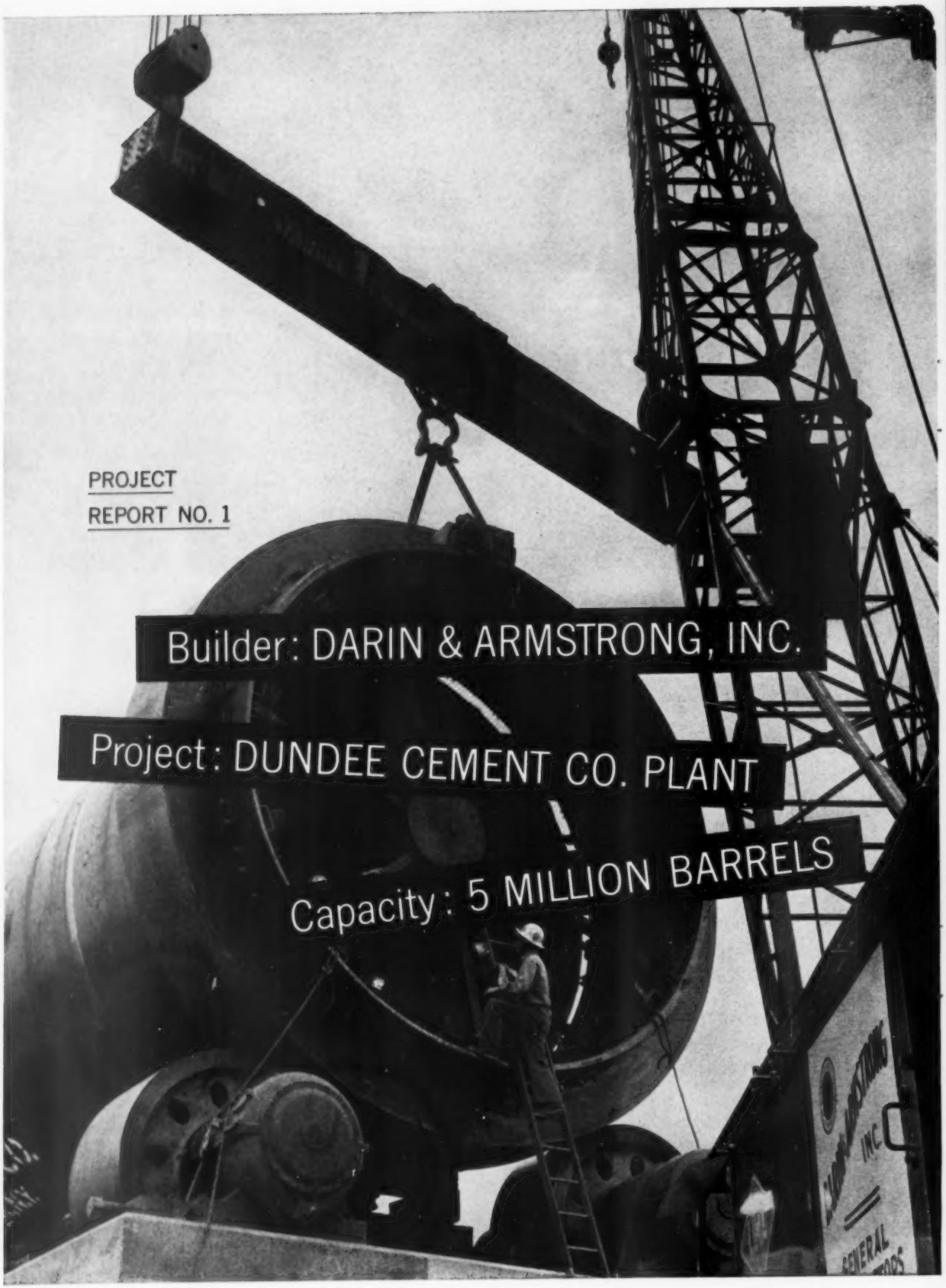
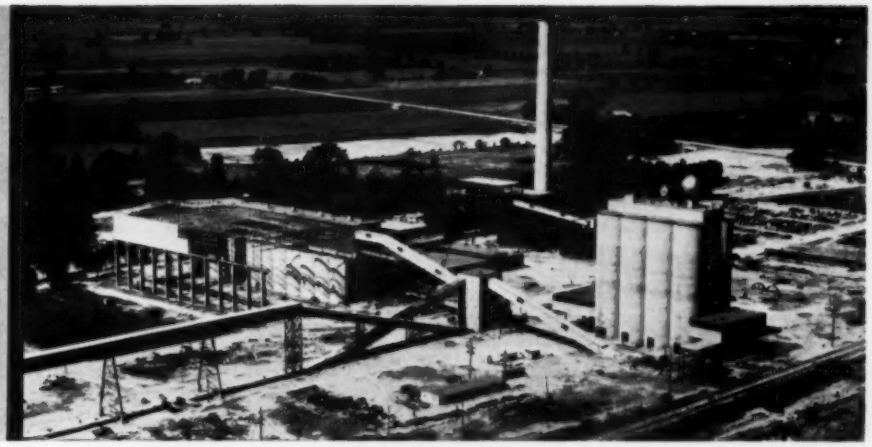

PROJECT
REPORT NO. 1
Builder: DARIN & ARMSTRONG, INC.
Project: DUNDEE CEMENT CO. PLANT
Capacity: 5 MILLION BARRELS

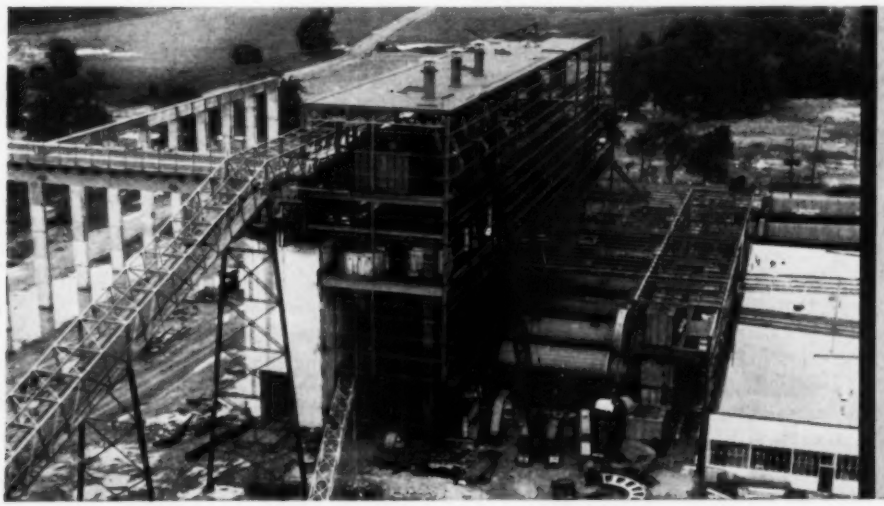


The plant is located about 40 miles southeast of Detroit. It was designed by the engineering department of the St. Lawrence Cement Company. Although the plant site covers an area of 1,500 acres, maximum operating efficiency will be achieved by concentrating all buildings and process facilities in an area of less than 900 x 1000 ft.

When completed and producing (this year), the Dundee plant will be one of the largest and most efficient on the North American continent.

Darin & Armstrong—the nation's largest builder of industrial plants—is especially qualified for projects of this type. They have the staff and facilities to handle both the building construction and the installation of machinery and equipment.

Because of the interest expressed by a great many cement manufacturers, Darin & Armstrong will publish, in this magazine, a series of reports on this project through its various stages of construction.

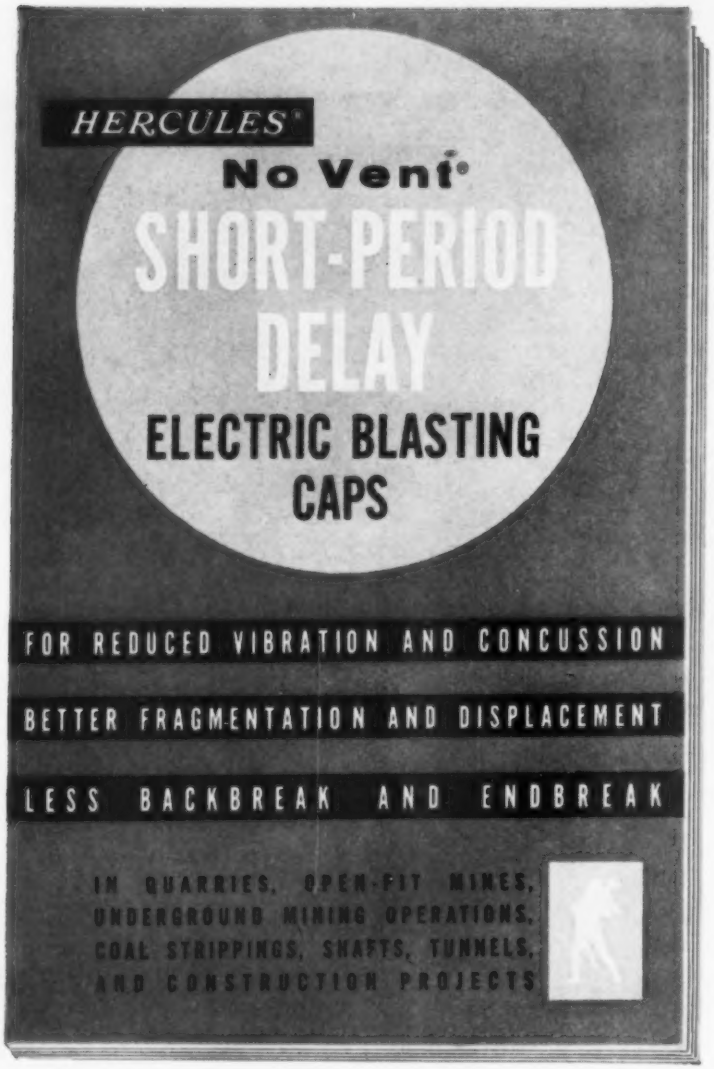


The mill building (shown here under construction), houses five 12′ x 36′ 2-compartment mills, directly coupled to 2,750-hp. motors. The kilns will have a capacity 50% greater than any other kilns in operation in this country. Under a firm price contract, Darin & Armstrong erected the mills and kilns in record time with the use of their two 100-ton crawler cranes.

DARIN & ARMSTRONG, INC.

GENERAL CONTRACTORS

DETROIT CHICAGO CINCINNATI



HERE IS YOUR COMPLETE GUIDE TO HERCULES® NO VENT® SHORT-PERIOD DELAY ELECTRIC BLASTING CAPS

Pioneering in explosives techniques and the development of improved materials have long been Hercules' aims. Hercules now offers an extended series of No Vent Short-Period Delay Electric Blasting Caps. They are manufactured to furnish twenty-seven closely timed delay intervals within a period of approximately 2,950 milliseconds.

To help acquaint you with this extended series, Hercules has prepared a 20-page booklet describing the characteristics of the caps, indicated uses, and recommended procedures. If you don't already have a copy of this valuable guide, you'll want to ask your Hercules representative for one. At the same time, he'll be glad to tell you more about how Hercules Blasting Caps can best meet your specific requirements.

Explosives Department

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Washington News Letter

(*Continued from page* 11)

pected that the investigation will have a small-business angle, based on the charge that high interest rates are finally driving all the owners of small businesses to the wall.

Since 1960 is a Presidential election year, this investigation will certainly not be the only one having the ultimate purpose of embarrassing the Administration. It can be expected that circuses, such as the recent investigation of fixed television shows, will be put on wherever possible.

If it were not so serious, the coming show in Washington could be the best entertainment in the country.

Labor Developments

(*Continued from page* 13)

governor may put those recommendations into effect.

This procedure amounts to the same things as various attempts at settlement, with the threat of compulsory arbitration hanging over the heads of the parties.

In Massachusetts, the law has been used on a number of occasions and it appears to have worked rather well. Its principal advantage is that is provides flexibility and also a method for imposing a settlement if the parties, as in the steel industry, are completely incapable of effecting a settlement. It also has the advantage of permitting rather mild early intervention. It is not crisis legislation; rather, it is designed to prevent a crisis from developing.

Congress can be expected to take a hard look at this legislation and, perhaps, model a new law after it. But it has one possible disadvantage. No one knows whether it is constitutional.

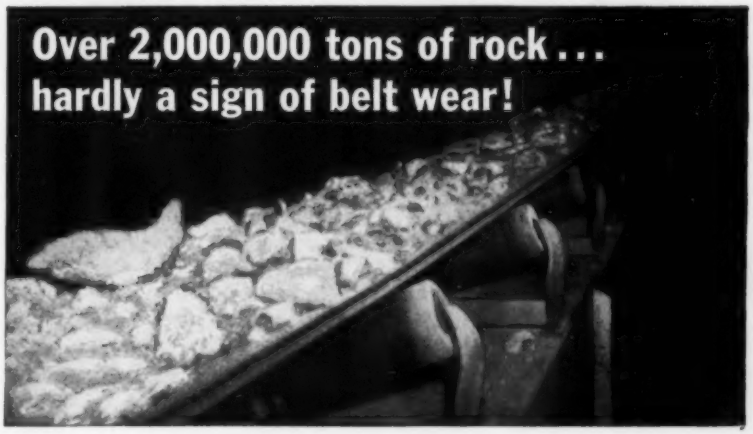
1958 U.S. Clay Production Shows 4 Percent Decrease

Domestic clay production decreased 4 percent in 1958, compared with 1957, according to the U.S. Bureau of Mines.

The following industries using 125,000 short tons or more of clay in 1958 registered decreases: refractories, 29 percent; rotary drilling mud, 23 percent; mineral oils and greases, 18 percent; absorbent uses, 7 percent; rubber, 6 percent; paper filling, 5 percent; heavy clay products (building brick, paving brick, drain tile, sewer pipe, and kindred products), 3 percent; and whiteware, 2 percent.

Industries using 125,000 short tons or more of clay that showed increases in 1958 were: chemicals, 30 percent; insecticides and fungicides, 21 percent; lightweight aggregate, 19 percent; paper coating, 7 percent; portland and other hydraulic cements, 3 percent; and floor and wall tile, 3 percent.

Domestic kaolin sold or used by producers in 1958 increased 2 percent in quantity and value. The major uses of kaolin in 1958 remained about the same as for the last several years, with the paper, rubber, refractories, and pottery industries accounting for 82 percent of the consumption.



That's the story behind the New York Rubber Stonore Nyrex conveyor belt, in regular, daily use by a large stone company. In this crushed stone plant, this heavy-duty belt carries stone from the primary crusher, located under the floor of the pit, over a belt distance of 455 feet at a 19° angle.

A belt *has* to be good to stand the tension required here *and* hold up under the abrasive effects of the crushed stone at the same time! Yet, this is the kind of service that is expected—and achieved regularly—with conveyor belting manufactured by New York Rubber Corp.

Take Stonore, for example. Highest in quality, mildew-proof, and built for the most severe service, it successfully handles heavy ores, trap rock, crushed stone, coarse broken glass, slag, cement clinkers, and direct feed from digging and mining machinery. It is also available as a special mucker belt.

If you want the service that this belt provides — or need any other type conveyor belt — it will pay you to consult New York Rubber. Drop us a line — there's no obligation. Address: Department PQ-4.

NY RUBBER

NEW YORK RUBBER
CORPORATION
Established 1851
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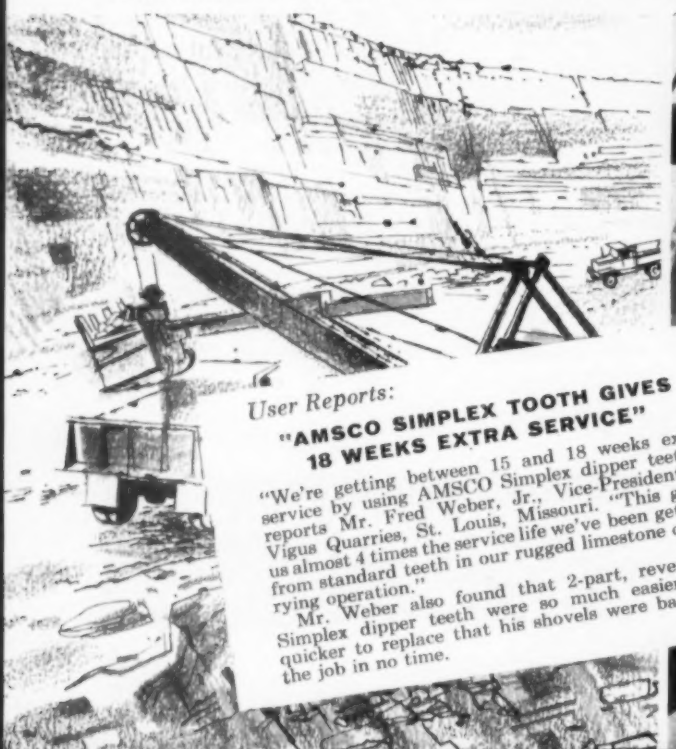
Enter 71 on card, page 167

How AMSCO helps you MOVE

User Reports:

"OVER 13 TIMES MORE SERVICE LIFE ...WITH AMSCO 'MML' ALLOY"

"Working in semi-molten slag at temperatures up to 1800°F., an AMSCO 'MML' ALLOY dipper front lasted 528 days. That's 13 times more service life than we got from the type previously used . . .; which gave a maximum of only 40 days' service." AMSCO "MML" ALLOY is a special combination of austenitic manganese steel and molybdenum, specifically developed for applications involving excessive heating as well as severe abrasion.



User Reports:

"AMSCO SIMPLEX TOOTH GIVES 18 WEEKS EXTRA SERVICE"

"We're getting between 15 and 18 weeks extra service by using AMSCO Simplex dipper teeth", reports Mr. Fred Weber, Jr., Vice-President of Vigus Quarries, St. Louis, Missouri. "This gives us almost 4 times the service life we've been getting from standard teeth in our rugged limestone quarrying operation."

Mr. Weber also found that 2-part, reversible Simplex dipper teeth were so much easier and quicker to replace that his shovels were back on the job in no time.

MORE TONS PER DOLLAR

For rugged digging, crushing, pumping, or rebuilding jobs... it pays to ASK for AMSCO!

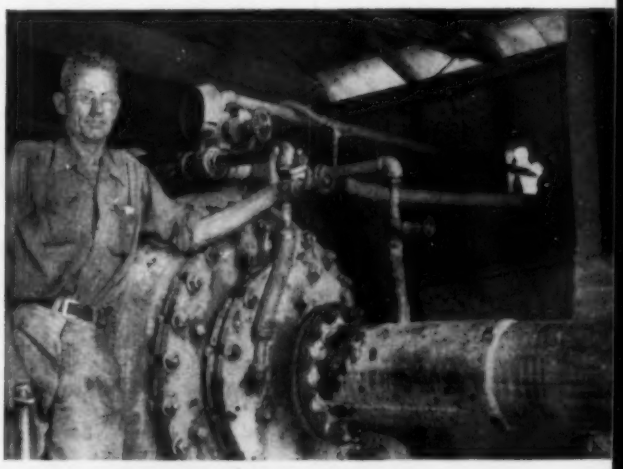
AMSCO's sole job is to help you fight wear caused by impact and abrasion. AMSCO Manganese Steel—"the toughest steel known"—is today's number one choice for long-lasting dippers, dipper parts, crushers, tractor parts.

AMSCO Alloys, developed to meet unusual wear problems, add extra service life under special and very severe operating conditions.

AMSCO Hardfacing Materials permit economical build-up or repair of worn parts—at a fraction of the cost of new parts. Use this specialized know-how and broad line of "wear-fighting" products to help *your* equipment move more tons per dollar. Ask for AMSCO!

NOW...WELD MANGANESE AS EASILY AS MILD STEEL

"We're getting just the kind of welds and build-up we want with good cost saving to boot," says a user of Nicro•Mang rod. From all over, in a variety of hardfacing applications, reports of success with AMSCO NICRO•MANG are coming in. Users like the stable arc, and wide range of arc length . . . the non-popping, the easy removal of slag . . . and above all the fast build-up. For high strength, superior crack resistance, and easy welding, Nicro•Mang is unbeatable for fabrication and build-up of manganese steel.



"29 YEARS WITH THE SAME 8" AMSCO PUMP"

Haskell Peel, Plant Superintendent at Consolidated Gravel Company, Columbus, Georgia, has shared many experiences with his 8" AMSCO PUMP. One of his favorites is the time that he and his pump almost dried out a lake to recover a sunken dredge. He hooked the 8" AMSCO to more than 1,000 ft. of 10" pipe, and ran it continuously for three days. No wonder the pump is his pet . . . it's been doing the job, pumping 75% sand and 25% gravel, for more than 29 years.

AMERICAN Brake Shoe COMPANY

AMSCO

American Manganese Steel Division • Chicago Heights, Ill.

Other Plants in: Denver • Los Angeles • New Castle, Dela. • Oakland, California • St. Louis

In Canada: Joliette Steel and Manitoba Steel Foundry Divisions

Welding products distributed by Canadian Liquid Air Co., Ltd.

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SMIDTH

rotary kilns...
grinding
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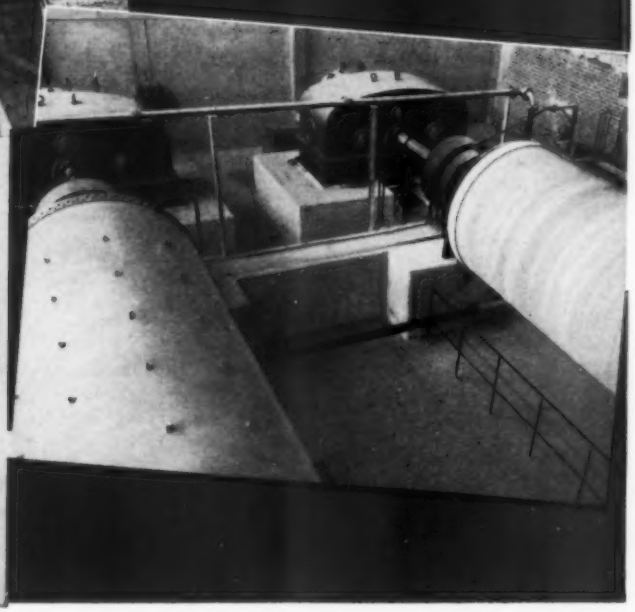
symetro drives
for
grinding mills



F. L. SMIDTH & CO.

Engineers and Machinery Manufacturers

11 WEST 42nd ST., NEW YORK 36, N. Y.

The Editor's Page

Important Conventions Ahead!

EVERY year producers of sand and gravel, crushed stone, agricultural limestone, and other nonmetallic minerals are offered an unparalleled opportunity to get the latest and most authoritative information on a wide variety of subjects important to the conduct of their businesses. This opportunity is available at the annual industry conventions, held early each year at a time when producers can most readily get away due to the normal seasonal slackening in business. Every second year, and 1960 is one of them, some aggregates associations also offer exhibitions of the many new and improved types of machinery and equipment used in their operations. No producer can afford to stay away.

The important annual conventions ahead are: The National Limestone Institute, Inc. (a merger of the National Agricultural Limestone Institute and the National Crushed Limestone Institute), Statler-Hilton, Washington, D.C., January 19 to 21, 1960; the National Sand and Gravel Association, in conjunction with the National Ready Mixed Concrete Association, Conrad Hilton Hotel, Chicago, February 15 to 19; and the National Crushed Stone Association, Conrad Hilton Hotel, Chicago, February 22 to 24. The N.C.S.A. and N.S.G.A.-N.R.M.C.A. meetings will feature their biennial expositions, which will be bigger and better than ever before.

During the winter there will also be a number of other conventions of nonmetallic minerals industries and of closely related industries, and meetings of technical and engineering societies of interest to them. More information on these can be found in the Coming Events columns in this issue.

THE N.L.I. convention in Washington will open on Monday, January 18, 1960, with meetings of the old N.A.L.I. and N.C.L.I. boards. Convention sessions for both the Agricultural Limestone and Crushed Limestone Divisions will begin Tuesday, January 19, and continue through Thursday, January 21.

N.S.G.A.-N.R.M.C.A. combined conventions will be held February 15 to 18, 1960, at the Conrad Hilton Hotel, Chicago, with exhibits in the hotel and at the Coliseum. Monday and Tuesday, February 15 and 16, are being left open for attendance at the exhibits, and the two boards of directors will meet on Tuesday. Convention sessions will begin on Wednesday, February 17, and will continue through Friday morning, February 19.

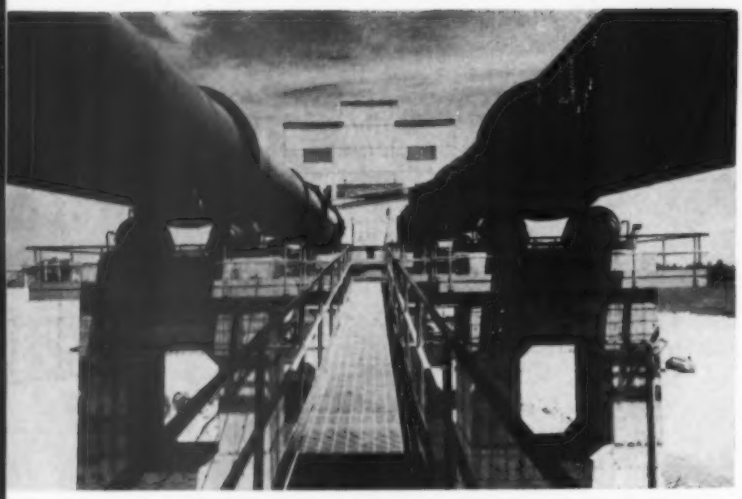
The N.C.S.A. convention will be held February 22 to 24 at the Conrad Hilton Hotel, Chicago. The directors will meet on Sunday afternoon, February 21. Convention sessions are scheduled on Monday morning, all day Tuesday, and on Wednesday afternoon. Ample time is left for inspection of the machinery exhibitions, which will be open from Monday morning through Wednesday noon.

THE complete official program of the N.L.I. convention is published in this issue of Pit and Quarry. The complete programs of the N.C.S.A. and N.S.G.A.-N.R.M.C.A. conventions will be published in the January, 1960, Annual Review and Forecast Number, along with layouts of the machinery exhibits, keyed to a complete list of exhibitors, as well as complete information on equipment to be exhibited by each company, and the names of the men to be in attendance.

Advance registrations and other indications assure a record-breaking attendance at these conventions. They are open to all producers and others interested. If you have not already made your hotel reservation, we urge you to do so at once.

Walter E. Trauffer

Lehigh's



THE TWO ROTARY KILNS (475 ft. long each), which are equipped with special radial heat transfer chambers, chain systems, and steel cross systems.

By WALTER E. TRAUFFER

AERIAL VIEW of Lehigh's new cement plant on the Tamiami Trail west of Miami, Fla. This modern 2,500,000 bbl., $25,000,000 operation was literally raised from the near-sea-level Everglades swamps.

new Miami plant

Features ....Underwater quarry
....Multi-stage raw grinding
....Efficient heat recovery
....Flexible finish mill
....Quick, flexible bulk loading

ANOTHER ON THE SPOT REPORT

A BIG step forward in the transition of the once romantic Florida Everglades to more practical uses was taken when, in July, 1958, the Lehigh Portland Cement Company put in operation its new plant near Miami. This 2,500,000-bbl., $25,000,000 operation was literally raised from the near-sea-level swamps and is now an impressive landmark, clearly visible from the famous Tamiami Trail, 7 miles west of the Miami city limits. It puts Lehigh in an excellent position to serve the growing south and southwest Florida market.

This plant is notable primarily for its modern design and efficient operation, which results from the company's long experience in building and operating plants in nearly every section of the United States. This particular site, and also the native raw materials, presented particularly difficult construction and operating problems never before encountered, but these were successfully solved. Concrete was used more extensively in the construction than in any previous Lehigh plant and this was largely responsible for its attractive appearance.

The quarry is unique in that it is entirely under water, and special methods had to be developed for efficient operation. Other features include the pre-grinding of sand and raw materials, other than rock, in two stages; the kiln heat recovery system, one of the few of its type in this country; the flexible mill department, which can concentrate all three mills on any one type of cement or make two different types at one time; the use of multiple bins ahead of the packers for quick change to different types of cement; and the use of special dust collectors as alleviators at the packhouse.

Five railroad tracks under the silos make possible rapid bulk loading of several types of cement simultaneously. The railroad tracks are a part of the concrete paving under the silos, so that trucks can also use the under-silo loading facilities. The uniform quality of the cement produced is credited to the uniform raw materials, and the accurate control of kilns, mills, etc.

Ground was broken for the plant in January, 1957, and the first concrete was poured in April. The crushing department was started up on May 15, 1958, the first kiln in July, and the second one on August 15. Clinker grinding began on July 17, only 15 months after concrete placing began. The first cement was shipped on August 4, 1958.

Six types of cement have already been made, including A.S.T.M Type I, IA, II, III, IIIA and Mortar cement. Type IIT can also be made.

The deposit is the porous coral rock common to this area, and the site is in an area zoned for heavy industry. The rock averages about 90 percent calcium carbonate, and the silica sand found in the deposit varies from 5 percent at the surface

THE OFFICE BUILDING, in which concrete was used in many different forms, presents a very attractive appearance.

to 25 percent at a depth of 50 ft.

In preparing for construction it was necessary first to remove from 2 to 3 ft. of muck from the surface of the rock. Then 4 to 5 ft. of rock —about 1,000,000 cu. yd.—from the quarry was filled to bring the plant level about 3 ft. above average ground-water level. The access road from the Tamiami Trail was built alongside a canal, and the fill was obtained by making the canal deeper and wider.

The other raw materials used are Staurolite residue from DuPont's titania recovery plant at Starke, Fla., which contains about 50 percent alumina, and slag from east Tennessee. This averages about 60 percent iron content. The gypsum used comes from Nova Scotia by boat and is trans-shipped by rail from Jacksonville.

Quarry Drilling is done with a Mayhew Dyna-Drill, mounted on a D8 Caterpillar tractor, with a 7½-in. rotary core-type bit which is attached to a 2-in. hollow Kelly bar. This drill was made to order after considerable experimentation with other types and has a 62-ft. mast, so that it can drill 50 ft. with no change of steel. The bit has external cutter inserts of special metal. Inside the bar and bit there is a core breaker which locks in place and can be raised or lowered by a wire. It has cutters on the bottom to cut up the core; and the hole is cleaned out by air. The core breaker is lifted out; and explosives are loaded through the steel, which is then also removed. This is necessary as the hole would otherwise fill in.

Each of the 50-ft. deep holes is loaded with Hercules Tritex. This explosive is alternated in the hole with 30 percent dynamite primers which are attached to Primacord. Millisecond-delay caps are used, and detonation is by a Hercules electric blasting machine. Every day one shot of three rows (of four holes each), spaced 14 by 14 ft., is drilled, loaded, and blasted. This method keeps blasting several hundred feet ahead of digging on the face, which is now 1,500 ft. long.

This underwater shooting keeps the broken rock close to the face within reach of the dragline. A disadvantage is that boulders cannot be seen, but these are kept to the minimum by blasting closer than would otherwise be necessary. The rock is excavated by a Bucyrus-Erie walking dragline with a 200-ft. boom and an 8-cu. yd. perforated bucket. As the rock surface averages 2 ft. below water level, the dragline fills in to provide a working area as it advances. It makes a cut about 80 ft. wide and 50 ft. deep.

The silica content of the rock increases with depth; so a rough separation is made by putting high and low silica rock in separate piles. As the rock does not drain well in these piles, the loading shovel stays close behind the dragline. This is a Marion 101 electric shovel with a 3-cu. yd. dipper. It loads selectively from the piles to four 15-cu. yd. Euclid rear-dump diesel trucks; a fifth truck is kept in reserve.

THE UNDERWATER QUARRY with the dragline which piles up rock to be loaded into trucks by the shovel (left). In background is the special rotary drill and another dragline.

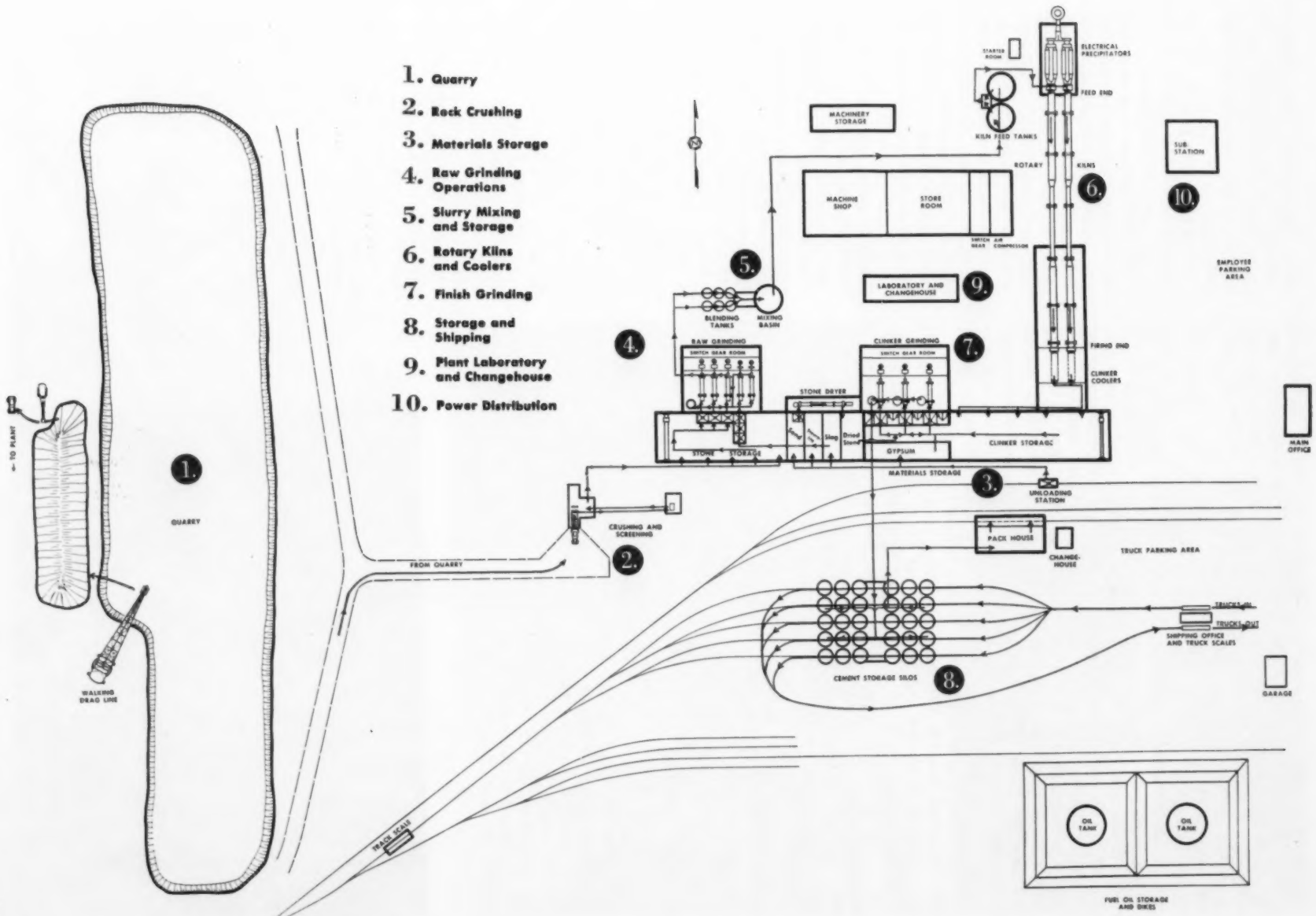
Raw Material Preparation The trucks haul about ½ mile to the primary crusher up a ramp high enough so that the crusher footing is above water. The rock is dumped on a 15-bar, 60-in. wide Universal Wobbler feeder which very efficiently removes minus 3-in. material from this wet and sticky feed. This feeder has a variable-speed control. Oversize goes to the 48- by 60-in. Traylor HB jaw primary crusher, which is rated at 550 t.p.h., reducing to 6 in. minus.

The minus 3-in. material through the Wobbler goes to a 5-ft. by 14-ft. Tyler Ty-Rock 2-deck screen with 2½-in. and ¾-in. wire cloth. The minus ¾-in. material through the bottom deck is carried to the storage building by a series of three 24- and 36-in. belt conveyors, approximately 30, 80, and 490 ft. long. The last conveyor is inclined to the top of the storage wall and is then horizontal for 336 ft., with a Chain Belt traveling tripper to discharge the stone to storage.

The ¾- to 6-in. oversize over the two decks of this screen is usually carried on a 42-in. by approximately 190-ft. belt to a 19- by 76-in. Syntron feeder ahead of a size 17-50 Pennsylvania Impactor. The minus ¾-in. product is carried on a 36-in. by approximately 160-ft. belt conveyor to a pair of 5-ft. by 14-ft. Ty-Rock 2-deck screens with ¾-in. mesh wire cloth. Oversize off both decks is returned to the conveyor to the Impactor. Minus ¾-in. fines through the screens go to the belt conveyor to plant storage.

The ¾- to 3-in. oversize from both decks of the first screen is also dryer rock. It can be discharged on the first of a series of four 24-in. belt conveyors approximately 23, 70, 250, and 19 ft. long. These feed to one pile in the storage building.

Materials Storage The storage building for all raw materials, clinker, and gypsum is 94 ft. wide and 864 ft. long. It has compartmented storage capacity for


1. Quarry
2. Rock Crushing
3. Materials Storage
4. Raw Grinding Operations
5. Slurry Mixing and Storage
6. Rotary Kilns and Coolers
7. Finish Grinding
8. Storage and Shipping
9. Plant Laboratory and Changehouse
10. Power Distribution
TO PLANT
QUARRY
WALKING DRAG LINE
CRUSHING AND SCREENING
FROM QUARRY
TRUCK SCALE
MACHINERY STORAGE
MACHINE SHOP
STORE ROOM
SWITCH GEAR
AIR COMPRESSOR
KILN FEED TANKS
ROTARY KILNS
ELECTRICAL PRECIPITATORS
STARTER ROOM
FEED END
FIRING END
CLINKER COOLERS
SUB STATION
EMPLOYEES PARKING AREA
LABORATORY AND CHANGEHOUSE
BLENDING TANKS
MIXING BASIN
RAW GRINDING
SWITCH GEAR ROOM
CLINKER GRINDING
STONE DRYER
STONE STORAGE
GYPSUM
CLINKER STORAGE
MATERIALS STORAGE
UNLOADING STATION
MAIN OFFICE
PACK HOUSE
CHANGE-HOUSE
TRUCK PARKING AREA
TRUCKS IN
TRUCKS OUT
SHIPPING OFFICE AND TRUCK SCALES
CEMENT STORAGE SILOS
GARAGE
OIL TANK
OIL TANK
FUEL OIL STORAGE AND DIKES

30,000 tons of stone, 3,400 tons of sand, 4,900 tons of slag, 4,900 tons of Staurolite residue (an alumina-bearing material which is a by-product of the Florida titanium industry), 5,900 tons of dried stone for mortar cement, 7,000 tons of gypsum, and 260,000 bbl. of clinker. All of these materials except the stone are unloaded separately from cars into a hopper. Hewitt-Robins car shakers facilitate unloading. A Jeffrey vibrating feeder, a Carrier conveyor, and two belt conveyors feed them to a shuttle belt conveyor from which they are discharged to storage. Two 17-ton P&H overhead traveling cranes with 6-cu. yd. Wellman clamshell buckets distribute these materials in storage, and also reclaim them.

Raw Mill One of these cranes rehandles the raw materials from storage to the raw mill feed bins. Stone is handled to three 150-ton bins for the three mills. There is also a 150-ton bin for slag, a 135-ton bin for sand, and a 150-ton bin for Staurolite residue to feed the sand mills.

Under each of the latter bins there is a variable-speed d.c. driven table feeder which discharges onto a McDowell Company ABC weighing scale. Each ABC scale regulates its table feeder r.p.m. by means of a Ward Leonard control to maintain constant weight. The ratio of the three belt speeds on the ABC scale is set to determine the correct proportions of sand, Staurolite, and slag. These feeders all discharge on a Carrier natural-frequency conveyor, and a short bucket elevator feeds to the first of the two sand mills in series.

These mills are 7-ft. 10½-in. by 43-ft. F. L. Smidth 2-compartment units with slide shoe bearings at their feed ends. Each is driven at 18.8 r.p.m. by a 900-hp., 720-r.p.m. Westinghouse synchronous motor through a Smidth Symetro drive. Each mill has 20,000 lb. of 2-in. and 14,000 lb. of 1½-in. forged steel balls in the first compartment and 66,000 lb. of 1¼-in. and 40,000 lb. of 1-in. balls in the second compartment.

Slurry from the No. 1 sand mill is fed by a 2½K Wilfley pump direct to the No. 2 sand mill, which is identical. Its product, ground to a fineness of 87 percent through 325 mesh and with a 34 percent moisture content, is pumped to a pair of 450- to 500-ton sand slurry storage tanks.

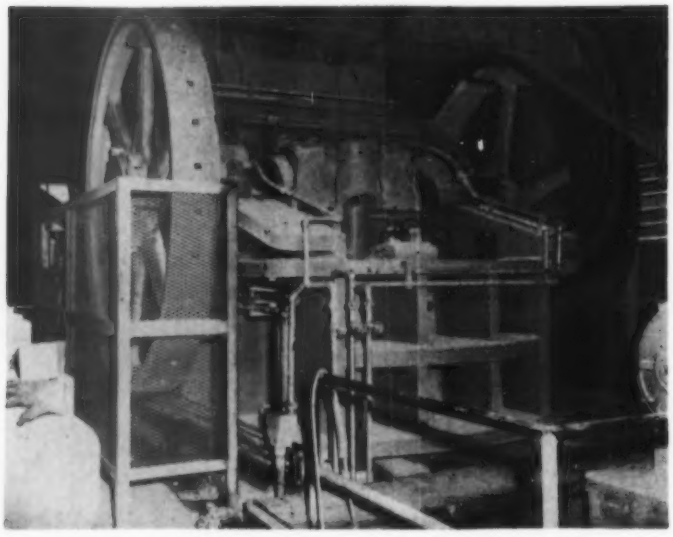
From one of these tanks Wilfley pumps discharge the sand slurry to the ferris wheel feeders of the three raw mills, excess slurry returning by gravity to the tanks. Rock is fed from the three mill feed bins by table feeders to Carrier conveyors and bucket elevators for transfer to the mills. The additional water needed is added there. A definite percentage relationship is established between the sand slurry and the rock by speeding up the d.c. drives of the rock table feeders and the ferris wheel feeders. This relationship is maintained automatically, but the actual total feed is varied by vibration pickup controls on each of the mills.

These are 8½-ft. by 43-ft. Smidth 3-compartment mills. Each is driven at 19.7 r.p.m. by a 1,250-hp., 720-r.p.m. Westinghouse synchronous motor through a Symetro drive. The first compartment of each mill is loaded with 25,000 lb. of 2½-in. and 21,000 lb. of 2-in. forged steel balls, the second with 21,000 lb. of 1½-in. and 15,000 lb. of 1¼-in., and the third compartment with 70,000 lb. of 1-in. and 38,000 lb. of ⅞-in. balls. The slurry is ground to 87 percent through 325 mesh and has a 34 percent moisture content.

Slurry Blending Slurry from all three mills flows into a common trough. A sample taken at this point is used to determine the composition of each mixing tank. One of two 5K Wilfley pumps feeds to one of six 1,600-bbl. mixing tanks. These are equipped with air agitators. Wilfley pumps withdraw as desired from one or more tanks at a time to the 55-ft. diameter, 6,200-bbl. blending tank. Much of the time the material from the mills is kiln feed and requires no correction. This mixing tank has a Dorr-Oliver circular rake and air for agitating and blending.

An 8K Wilfley pump feeds the blended slurry from the mixing tank to the two kiln feed tanks, each of which also has a 6,200-bbl. capacity. Wilfley 8K pumps feed to ferris wheel kiln feeders of the overflow type. The slurry is discharged into the kilns through pipes with a swirl pot section which blends in reclaimed dust.

Kilns The two F. L. Smidth kilns are 12, 11, and 12 ft. in diameter and 475 ft. long. They have a slope of 7/16 in. per foot, and they have six floating tires on special alloy steel rollers. Each is driven at 60 r.p.h. by a 200-hp. variable-speed d.c. motor through a Foote herringbone reducer, and

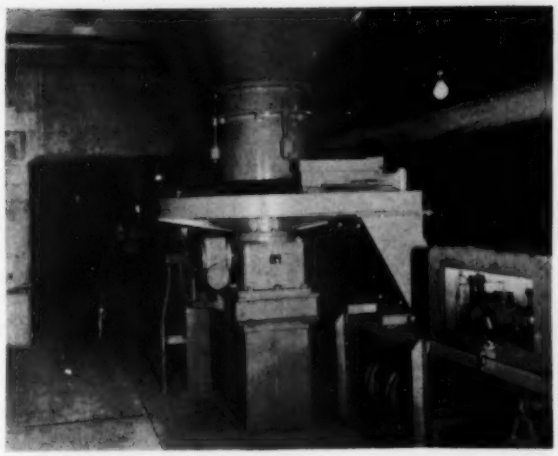


THE JAW PRIMARY CRUSHER (48 in. by 60 in.) which reduces all rock to 6 in. and under.

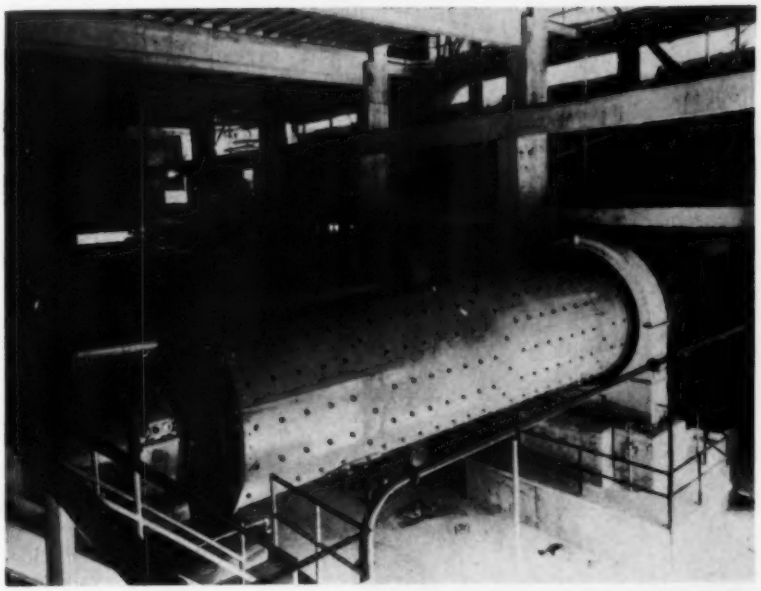
reduction gears. A Farval automatic spray lubricating system is used. There is a Hercules gasoline engine for use in an emergency.

In the feed end of each kiln there is a Smidth integral slurry preheater which is 12 ft. 9 in. long. This is a cross arrangement of four chambers containing heat transfer media along the arms of the cross and four empty segments between the arms. The heat transfer media consist of short sawed-off sections of 4-in. steel pipe. The hot gases enter two of the empty segments passing through grates into the sections containing the media, and leave through grates on the other side into the other empty segments and out of the kiln. The slurry passes countercurrent to the gas flow. Next to the preheater is a conventional chain system 58 ft. 4 in. long, followed by a heat-exchanging stainless steel cross system.

At the feed end of the kiln there is a 15-ft. section of 6-in. wear-resisting brick. There is no lining



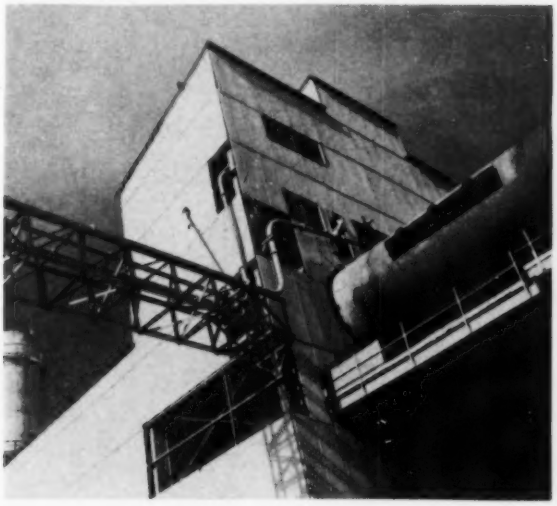
FEED for the preliminary sand mill is supplied by a table feeder regulated by a weighing conveyor scale (right).

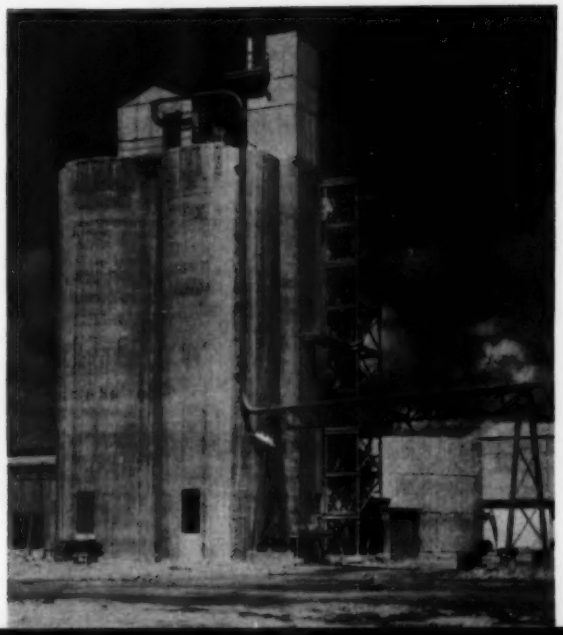


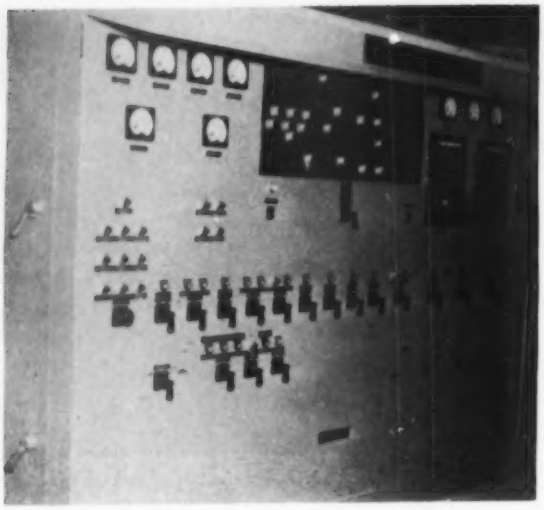
RIGHT: The two sand grinding mills and the three finish (stone and sand slurry) mills in the raw-grinding department.

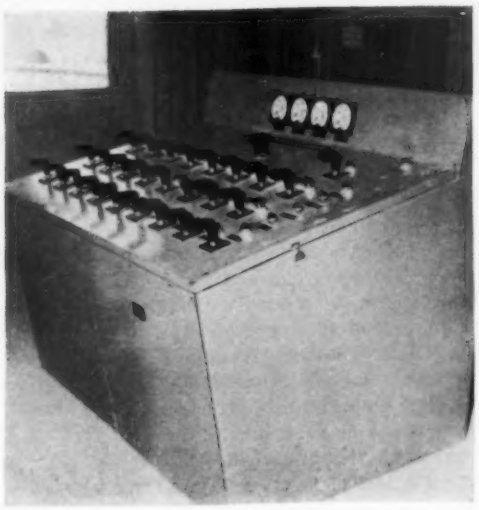
BELOW, right: The six 1,600-bbl. slurry-mixing tanks with the final 6,200-bbl. blending tank (right), all equipped for mechanical and air agitation.

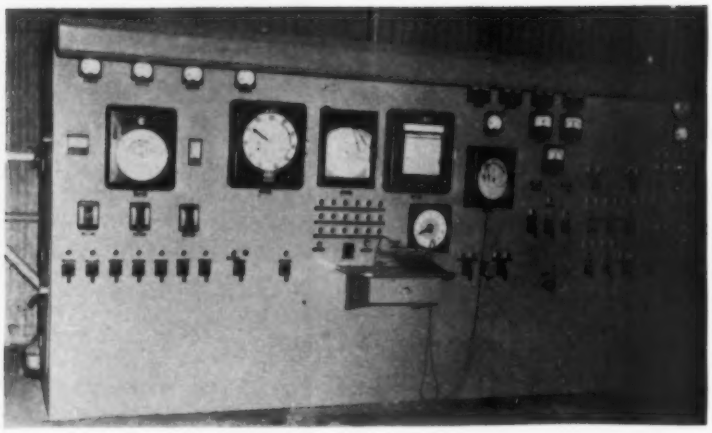
BELOW, left: The feed end of one of the two kilns, showing one of the four internal radial heat transfer chambers.

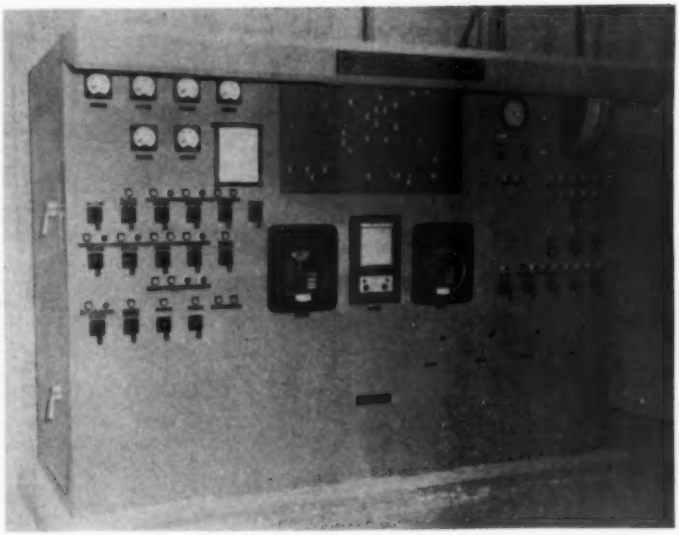












MANY CENTRALIZED CONTROL BOARDS, panels and consoles are used in this plant, as indicated by these selected views. TOP, right: The control console for the primary and secondary crushing departments. TOP, left: The control board for the two raw sand grinding circuits. MIDDLE, left: The panel for one of the three finish raw mills. MIDDLE, right: The control board for one of the three kilns. BOTTOM: The control board for one of the two clinker grinding mills.

at the preheater for a distance of 16 ft. 11 in.; but there is a 66-ft. 8-in. section of 6-in. wear-resisting brick at the chain system, followed by 71 ft. 4 in. of R. K. Block Superduty to the taper, which is 8 ft. long and similarly lined. The 11-ft. diameter section of the kiln (148 ft. 6 in. long) and the next 8-ft. taper are lined with 6-in. Superduty R. K. brick. The final 12-ft. diameter section is lined with 64 ft. 8¾ in. of Superduty, 20 ft. of 70 percent alumina, 50 ft. of basic, and 10 ft. of Superduty. All brick is 6 in.

Clinker Cooling Clinker is discharged from each kiln to a 7- by 50-ft. Fuller No. 750 horizontal moving grate cooler, which differs from conventional units in its automatic control system. The grate speed, which is variable through a Reeves drive, depends on the undergrate pressure; this in turn depends on the secondary air temperature, which is held between 1,000 and 1,100 deg. F.

The first and hottest of the three compartments of the cooler has its own fan, with a damper which is automatically controlled. If the secondary air temperature goes up, this damper opens, increasing the undergrate pressure and automatically speeding up the grate in order to maintain the desired 6-in. pressure.

The second and third compartments are served by the main cooler fan with hand-set controls for undergrate pressure, which varies between 4 and 5 in. in No. 2, and 2½ to 3 in. in No. 3 compartment. The hood draft is controlled by a variable vent damper ahead of the cooler vent fan which automatically maintains the preset negative hood draft of 0.4 to 0.8 in., as may be desired. The excess air is vented to a stack through a dust collector, and the dust is chuted back to the grate discharge.

Cooled clinker is discharged from both kilns on one of two duplicate conveyor systems. One system is usually a stand-by, but both could be used if each kiln were making a different type of clinker. A Carrier vibrating conveyor at right angles to the coolers receives the clinker directly and also the undergrate fines *via* screw conveyor. An inclined Carrier conveyor feeds a bucket elevator from which the clinker can either be spouted direct to storage or to two drag chain conveyors in series which discharge through several spouts to storage.

Fuel The fuel used is Bunker C (No. 6) oil, which is stored in two 600,000-gal. storage tanks. From these it is pumped to a steam heat exchanger having two boilers, one in reserve. The oil is then pumped at 240 deg. F. and 1,000 lb. pressure to the kiln floor. There pressure is reduced to about 800 lb. for the Coen pressure-atomizing burners. The burner pipe is of stainless steel and is air cooled.

Exit Gases Exit gases from each kiln go directly to a 110,000-c.f.m. Buell SF electrostatic precipitator consisting of two separate parallel units of four compartments each; one can be shut down while the other is still in use.

Buffalo heavy-duty fans draw the gases from both kilns and discharge to the 137-ft. concrete stack, which is 15 ft. in diameter at its insulating lining. The height of the stack is limited by the C.A.A. because the plant is on one of the instrument approaches to Miami's famous International Airport.

In each kiln circuit dust settles out in the rear housing and in four hoppers under each precipitator. As there is no alkali problem, all dust is returned to the kilns. Cross-screw conveyors feed to a main screw supplying an elevator which discharges into a bin over the feed end of the kiln. A screw feeder driven through a Link-Belt P.I.V. variable-speed reducer controls the rate of feed into the vortex of a swirl pot in the kiln feed pipe. When the feeder is shut off, the dust may overflow the bin into a hopper from which trucks haul away the dust.

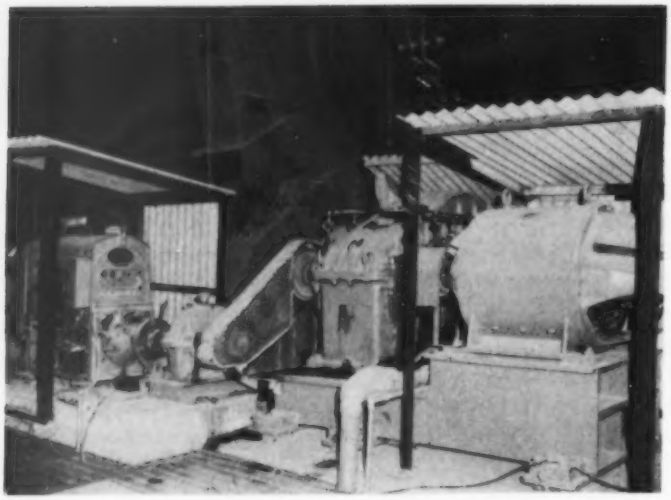
Kiln Control In kiln operation one aim is to keep the flue gas under 2 percent oxygen. Another aim is to keep the temperature below the heat exchanger cross at 1,500 deg., as this results in most efficient operation. The temperature below the chains is from 1,100 to 1,200 deg. F. The electrical precipitator is well insulated; so there is no moisture precipitation. Operating the kilns at 60 r.p.h. is resulting in a daily output of 3,500 bbl. from each, which is about their rated capacity.

Rock Drying One of the overhead cranes transfers the dryer rock from storage into a hopper. A Stephens-Adamson plate feeder and a bucket elevator feed it to the 7- by 80-ft. F. L. Smidth rotary drier. This unit, direct-fired by a Todd oil burner, has a maximum temperature of 1,400 deg. F., with a 390-deg. exit gas temperature. Moisture content of the stone is reduced from about 10 percent to 3 percent or less. The dried stone is discharged to a 9- by 30-in. Kue-Ken jaw crusher which reduces it to ¾ in. minus. This material is elevated to storage, where the crane can pick it up to service the stone bins when mortar cement is being made.

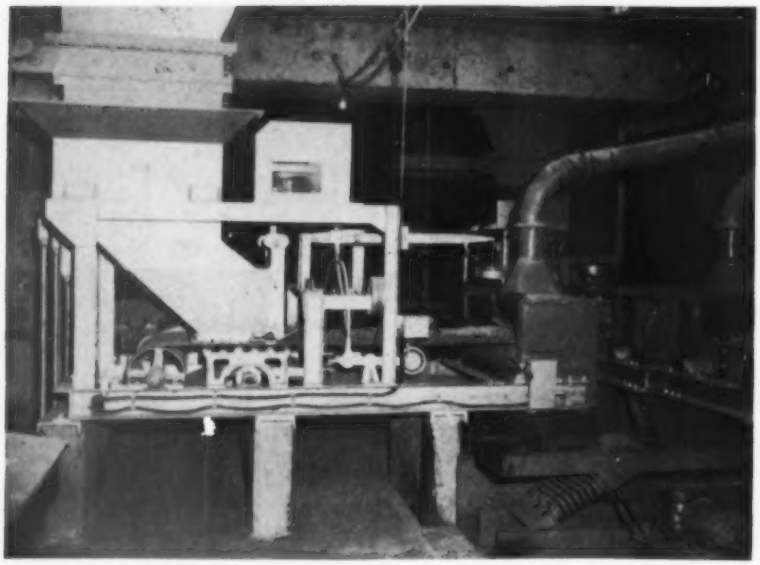
Finish Grinding Materials for the finish-grinding mills are fed from storage by one of the traveling cranes into mill feed bins. There is a 260-ton clinker bin for each of the three mills, a 290-ton gypsum bin for two mills, and a 135-ton bin for the other, and two 290-ton masonry or dry stone bins, one serving two mills. With this arrangement, one mill or the other two, or all three can make masonry cement. If desired, two types of cement can be made at one time. Schaffer Poidometers feed these three materials to each mill in the desired proportions. The blend is carried by a Carrier conveyor and a bucket elevator to the mill feed spout.

A room in the finish-grinding department is used for mixing and storing various additives, which include plasticizers for mortar cement, neutralized Vinsol resin solution for air-entraining, and masonry cements. A pump discharges the required additives in the proper amounts on one of the Poidometer belts feeding each mill.

These units are 8-ft. 6-in. by 39-ft. 4-in. Smidth 3-compartment Unidan mills with slide shoe bearings at their feed ends. Each is driven at 19.7 r.p.m. by a 1,250-hp. 720-r.p.m. Westinghouse synchronous



THE DRIVE for each of the two 475-ft. kilns is supplied by a 200-hp. d.c. motor through a herringbone reducer and reduction gears. At the left is the auxiliary gasoline engine drive.



WEIGHING FEEDERS (two of three) and the oscillating conveyor feeding one of the three clinker - grinding mills.

TOTALIZER and dials for bulk truck load-cell scale. This scale has three platforms to insure compliance with axle load regulations.

motor through a Smidth Symetro drive. Each mill has 25,000 lb. of 3-in. and 21,000 lb. of 2½-in. forged steel balls in the first compartment; 10,000 lb. of 2-in., 16,000 lb. of 1½-in., and 10,000 lb. of 1¼-in. forged steel balls in the second compartment; and 68,000 lb. of ¾- and 30,000 lb. of ⅝-in. Ni-Hard balls in the third compartment.

The product of each mill is fed by an elevator and a 24-in. screw conveyor into a 16-ft. diameter Sturtevant separator. Oversize is spouted back to the feed end of the mill. The separator exhausts to a No. 546A Norblo automatic bag-type dust collector used for cooling; it is 35 ft. long and is rated at 17,000 c.f.m. A screw conveyor under the collector feeds the dust into an 18-in. mixing screw with the product of the separator. These screws feed the finished cement from one of the mills to a 7-in. Fuller-Kinyon pump, and that from the other two mills to a 9-in. pump for transfer to the storage silos. Each mill circuit grinds about 155 bbl. of Type I cement per hour to a Wagner fineness of 1,730 sq. cm./gm.

Cement Storage The 480,000-bbl. capacity cement storage consists of two banks of 15 silos each, in three rows of five. These are 32 ft. I.D., and their tops are 124 ft. above ground level. Three open-top Airslides inside each silo aerate the cement for easy discharge. There are openings at the tops of the silos, so that they can alleviate into each other. The silos have conical bottoms, the lower part steel. Under each silo is a split chute, each leg going to a Fuller rotary valve.

From one valve bulk cars or trucks are loaded through a flexible spout. After being loaded, the cars are weighed on a Fairbanks-Morse 150-ton railroad scale. Incoming trucks are weighed on a Fairbanks-Morse 50-ton load-cell-

type scale with a 10- by 50-ft. platform. There are five separate loading tunnels with six loading stations under each tunnel. From each one of these thirty locations a car or truck may be loaded and weighed and ready to roll in 12 to 15 minutes. Loaded trucks are weighed on another F-M load-cell scale with three platforms—10 by 10 ft., 12 by 10 ft., and 20 by 10 ft.—so that they will comply with axle load regulations. This scale has three dials and a totalizer.

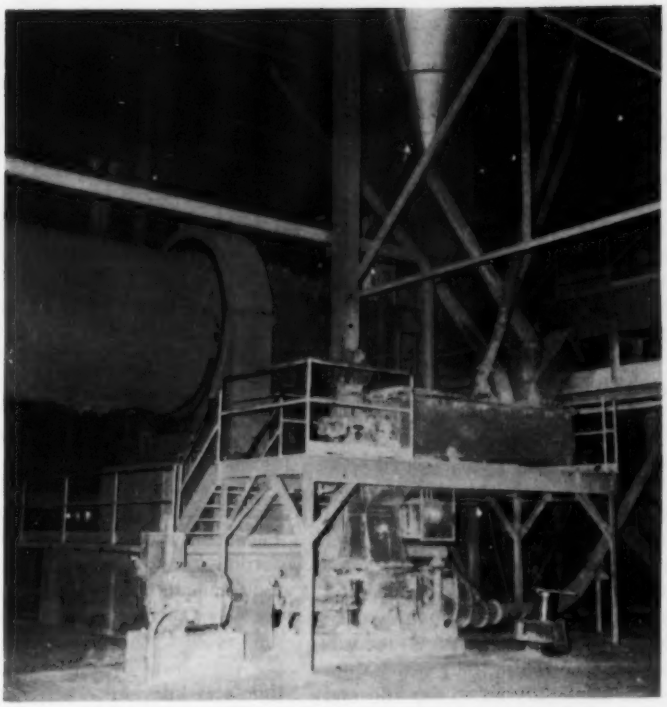
Packing The other rotary valve under each silo feeds to a 6-in. Airslide, and 12-in. Airslides on a 9-degree slope feed to three Fuller-Kinyon Type H, 9-in. pumps. Standard portland cement is discharged through a 10-in. line to a Norblo No. 156 AMS bag-type alleviator dust collector in the packhouse. A screw conveyor and rotary feeder discharge the cement to another screw, which has five motorized rotary feeders. These and the screw end discharge into six of seven 400-bbl. storage bins, each of which can be used for a different type of cement. Mortar cement is fed by a similar system, also with a dust collector, to the seventh bin.

Mortar cement is fed from its bin by an Airslide direct to a 4-tube St. Regis packer.

Standard cement is fed by Airslides to a rotary feeder and then transferred by screw conveyor and bucket elevator to a vibrating screen. This cement goes to the hopper of another 4-spout St. Regis packer. Any overflow goes to a screw paralleling the main bin feed screw and identical with it.

From both packers, sacks of cement are discharged on a reversible wire belt conveyor. At one end this conveyor discharges to a Flexoveyor sectional wire belt conveyor system from which trucks are loaded. At the other end of the reversible belt conveyor hand trucks are used for loading cars.

Sampling Sampling and testing for chemical control is just as thorough as any other phase of operation. Slurry going to each of the mixing tanks is sampled and given a complete analysis. The kiln feed tanks are sampled every 4 hours, and a complete analysis of the composite sample is made daily. Clinker from the kilns is sampled every 2 hours, and a daily check is made for free lime, which is usually under 1 percent. Finished cement is checked every four hours for fineness, sulphur trioxide, etc.; and when masonry cement is being made, other tests are included. Every carload of cement shipped is sampled and spot-check tested, and regular tests are also made of the fuel oil. The usual complete chemical and physical tests are made daily.



A CLINKER MILL (one of three) with the 16-ft. separator in closed circuit. At the right is the mixing screw over the cement pump to the silos.

Centralized Controls The entire plant is controlled from centralized panels at various locations, including the crusher house, the raw mill, the kiln, the finish mill, and the packhouse.

At the crushing department there is a control console for both the primary and secondary crushing buildings. Pushbuttons are used for starting, and an automatic interlock stops equipment in sequence.

In the raw mill building there is a large control board for the Staurolite, slag, and sand system, including the two sand-slurry mills. There are smaller boards for each of the three raw mills. Each of the grinding systems has automatic feed control through vibration pickup and Leeds & Northrup control devices. The three small boards have speed indicators for the sand-slurry feeders to the raw mills, and there are also the usual start-stop switches, ammeters, etc.

Each of the three finish mills has its individual control board. There is a Leeds & Northrup automatic feed control for each mill, which is actuated by the load on the mill discharge elevator; as the load varies, the rate of feed is automatically adjusted. The ratios between the three poidometers can also be changed from the board. In addition, there are temperature recorders for the cement at the discharge end of the mill and at the separator outlet.

Although it is seldom needed, there is a water-cooling spray inside the discharge end of each mill to prevent loss of water of hydration from the gypsum due to excessive heat. This spray automatically turns on at 260 deg. F. and shuts off at a predetermined temperature. All boards have Foxboro dew point re-

corders and temperature indicators for the mill circuit dust collectors to protect against condensation.

The packhouse control board has signals for the high- and low-bin-level indicators, the usual switches, etc.

Each of the two kiln control panels has Hays draft recorders for the back end and the hood. Kiln draft is manually controlled from the kiln control panel through a motorized louvre damper. Speed control for the draft fan is located in the kiln outlet building. There is a Leeds & Northrup Micromax recorder for temperature at the back end, below the chains, and below the cross system; and for the kiln speed. In addition, there is a Beckman oxygen analyzer. The cooler control on this board, the only automatic control, is a Bailey pneumatic system. It is actually composed of three interrelated controls recording and controlling the temperature of the secondary air to the kiln and the overgrate and undergrate pressures in the cooler. As in most other plants the intelligence and experience of the burner is the basic control.

All control and power rooms are pressurized through American Air Filter oil bath traveling screens.

Dust Collection Protection against dust in the plant is provided by Northern Blower Co. Norblo bag-type dust collectors in every department. In the primary crusher building there is a No. 468-A collector; the secondary crusher building has a No. 120AS collector; and the raw mill building has a No. 312-A collector. Because the raw rock and sand are wet and the wet process is used, none of the above collectors has yet been needed. The kiln outlet building has a No. 156-A collector. The finish mill building has three No. 546-A collectors used for cooling in circuit with the mills. At the cement storage silos three No. 156 AMS collectors are used to vent the Airslide system. There are also two No. 312-A collectors in the packhouse, and two No. 156-A collectors which are used as receivers and alleviators for cement being pumped from the silos.

Dust is collected from the kiln exit gases by Buell SF 110,000-c.f.m. electrostatic precipitators. There is a Western Precipitation Corporation Multiclone collector for the cooler air.

Power Electric power for this plant is received at 69,000 v. at a Florida Power and Light Company substation on the property, where it is reduced to 4,160 v. There are two separate underground lines of 18-500 MCM conductors, each leading to the switchgear room, from which the 4,160 v. current is distributed to stations at the quarry, the crushing department, the raw mill, the raw mill auxiliary, the emergency generator, the kilns, the storage cranes, the clinker mill, the clinker mill auxiliary, the silos and packhouse, and the plant auxiliary. Each of these 11 stations has a recording kilowatt meter so that power requirements can be analyzed. The 4,160-v. current is used for the 8 mill motors, the Impactor crusher, the m.-g. sets on the shovel, dragline, and kiln. All other motors use 440-v. current from departmental transformers next to the motor control centers. The plant consumes about 200,000 kw. of power per day.

Air and Water Compressed air for general use in the plant is supplied by four Fuller Type C two-stage rotary compressors driven by 200-hp. motors. These supply air at 100-lb. pressure for slurry agitation, dust arrester rapping, mill air, etc. Each of the Fuller-Kinyon pumps in the plant has a separate Fuller compressor nearby.

Water for plant use is obtained from 42-ft. deep wells by Fairbanks-Morse turbine pumps rated at 750 g.p.m. at 80 p.s.i. They are driven by 50-hp. motors. There is a separate well and pump for the fire control system, which is driven by an 85-hp. Continental gasoline engine. No standpipe or storage tank is used.

Construction Nearly 100,000 cu. yd. of concrete was supplied by the Walsh-Perini-Rooney ready-mix plant on the site. The concrete storage building has 100-ft. prestressed double-T section roof girders, each weighing 53 tons. The truck garage, shops etc., are all tilt-up precast placed on the job. The mill building and the 400-ft. long shop building have prestressed girders, and all buildings have precast concrete roofs. All silos and tanks are of slip form construction from the ground up. Many foundations were placed on top of the very solid rock; but where the rock was underwater, the rock had to be grouted first. Most of the plant area is paved with concrete.

General The plant flow was designed by F. L. Smidth & Company, which also supplied most of the heavy equipment, including kilns, mills, etc. The buildings and foundations were designed by the Walsh-Perini-Rooney Company, a joint venture of three large contracting firms, which had the general contract and did all of the concrete work. Subcontractors handled the machinery erection, the siding and roofing and the electrical work. Westinghouse supplied the electric motors and equipment and did the electrical drafting. Other equipment includes Norblo dust collectors, Chain Belt bucket elevators and belt conveyors, Hewitt-Robins conveyor belting, and Mosser screw conveyors.

All plant operations of Lehigh are under the supervision of its manufacturing division, headed by P. A. Groll, executive vice-president, and Arnold J. Johnson, vice-president, who had general supervision of this construction project. John F. Hower is chief electrical engineer. William J. Klein, plant manager, had previously been assistant plant manager at Bunnell, Fla., and plant manager at Birmingham, Ala. Leslie W. Copple is assistant plant manager, and Hayes Jensen is plant engineer. Edwin E. Gross is chief chemist.

Phosphorite deposits of undetermined amounts have been recently discovered in the sea not far from San Diego, Calif. A half-ton of the mineral was dredged from the ocean bottom by scientists from the University of California. The mineral, a possible basis for a fertilizer industry, was obtained from deposits that accumulated on the ocean floor for millions of years, reaching depths up to six feet thick.

The first phase of the improvement program to be finished at the Salt Lake City plant was the glass-bag dust-collecting structure. The two existing kilns now exhaust their gases through the new filtering system, making the steel stacks (right) obsolete.

By HARRY F. UTLEY

Revamping Salt Lake City Cement Plant To Boost Capacity by 1,600 Bbl.

ANOTHER ON THE SPOT REPORT

A MAJOR plant expansion and modernization program involving the expenditure of about $2 million is currently under way at the plant of the Portland Cement Company of Utah in Salt Lake City.

The first portland cement plant in the state, and one of the pioneer operations in the country, this plant was originally built in 1906 by British interests. It was acquired some years later by Utah residents and underwent few changes over the years until the current project was undertaken. When the present work is completed in the spring of 1960, capacity will have been increased from 1,400 to 3,000 bbl. per day, dust emanation will be eliminated to a high degree, and operating costs are expected to be reduced.

When the plant was built 53 years ago, it had two 125-ft. rotary kilns and was operated by the dry process. During World War I stack gases were captured to leach out potash and other critically-needed by-products. Afterward, the leaching tanks were converted to slurry-blending as the plant changed over to the wet process of manufacture. The kilns were lengthened to 185 ft., and new grinding equipment was installed.

The present program involves the addition of a 10- by 300-ft. Allis-Chalmers kiln, to be carried on high-level concrete supports, a Fuller 620 horizontal grate-type cooler, a new finish mill, and a Western Precipitation Corporation Therm-O-Flex dust-collecting system to handle the kiln-exit gases.

The Therm-O-Flex bag-house installation was completed late in the summer of 1959 and is already recovering dust from the two old kilns at nearly 100 percent efficiency. It is preceded by new Multiclone collectors which extract the heavier dust particles from the gas stream before the Menardi silicone-treated glass-fabric bags in the Therm-O-Flex unit filter out the remaining fine dust.

The bag-house contains 960 individual glass-cloth bags, heat-resistant to 550 deg. F. Each bag is 12 in. in diameter and 25 ft. long. They are arranged in groups of 60 bags, and each group is automatically collapsed for 90 seconds every half hour to drop the accumulated dust into the screw-conveyor recovery hoppers below for return to the system. The structure housing the bags, hoppers, and conveyors is 56 ft. high, 30 ft. wide, and 81 ft. long.

A new 11½- by 17-ft. Allis-Chalmers single-compartment finish grinding ball mill has been installed, close-circuited with Sturtevant air-separators and Norblo collectors. The mill is driven by a 1,250-hp. Westinghouse motor, and the product is handled by Fuller-Huron Air-slides. Existing grinding equipment —four 6- by 22-ft. Allis-Chalmers tube mills—will be used exclusively for raw-grinding. One of the units will be converted to a rod mill and close-circuted with a Hewitt-Robins Vibrex 48-mesh screen.

An old water-quenching system used on the clinker from the existing kilns is being replaced with a Carrier natural-frequency conveyor for air cooling.

Additional improvements contem-

(*Continued on page* 91)

Small Operator Overcomes Obstacles —

production, material problems solved through quarry and plant revisions, concentration on specific markets

WHEN the Hess & Son Rock Material Company operation was started near Lacona, Iowa, several years ago, some serious product and operating difficulties were encountered. Immediate solution of some of the problems was necessary; others could be (and were) attended to as time went on, and the organization became firmly established.

Approximately a year ago a revision to the primary crushing installation represented the fourth change to be made to the operation since the original 60-t.p.h. plant was erected. The four revisions, all made in a span of 10 years, have culminated in a compact, efficient 150-t.p.h. facility that gives testimony to the perseverance of its owner in overcoming the early difficulties.

At the time C. D. Hess acquired the property, it contained a quarry that had been opened and previously operated by state and county highway departments. The development reflected a rather inconsistent pattern of extraction, material having been removed from scattered points on various levels.

Not only did the quarry area pose a problem in renovation before equipment could be utilized with adequate capacity and efficiency, but the rock itself presented other obstacles. Aggregates made from this particular limestone formation, although hard and dense, fail to pass freeze-and-thaw tests. Despite this seeming handicap, however, it was possible to capitalize on a potential market for road maintenance materials, and 85 to 90 percent of the production is currently sold for those purposes.

The various revisions subsequently made to the original facility were also mainly directed toward that objective, and the plant now produces five basic road repair materials ranging from a top size of 1½ in. to dust, plus agricultural limestone. Although it is possible to make all five basic products simul-

An overall view of the compact Hess operation near Lacona, Iowa. At the right is the primary crushing installation; at the center, the secondary crusher; at the left, the scalping and finishing screens above the loading bins.

C. D. Hess, owner-operator, faced many problems in getting this operation under way. He solved them all in developing it to the present effective status.

By BUREN C. HEROD

taneously, three are made at one time in routine operation.

In this area, the dipping stratum of the formation being quarried has medium bedding. At first, the benching method was attempted, but due to the ridged bench surface caused by the bedding dip and thickness, it was difficult to operate the equipment.

A considerable amount of reworking was required to get the hashed-up quarry area in shape. This involved filling, leveling, relocation of former drainage channels, and new ditching. The quarry face was also straightened, and since the benching method was abandoned, is now operated as a full face about 70 to 72 ft. in height.

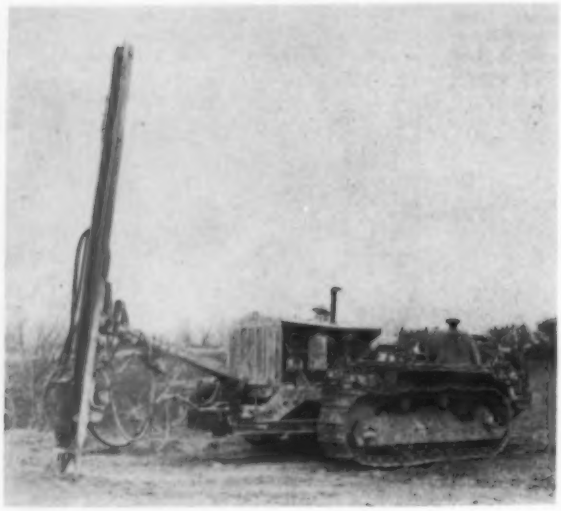
Removal of overburden is handled under contract with an earthmoving firm. Blastholes are sunk with a Gardner-Denver drill mounted on a Caterpillar tractor. This unit, shown in an accompanying photograph, replaced old wagon drills. Standard explosives are loaded into the 2¾-in. blastholes, and the yield ratio from blasting has averaged about 4 tons per pound of explosive. Any necessary secondary breakage is done by dropballing.

Broken rock is loaded out in the quarry by a 1½-cu. yd. Bucyrus-Erie diesel shovel, and is hauled to the plant feed hopper at the top of the quarry in a pair of 10-ton rear-dump Euclids. The quarry-run rock fragments have an unusual amygdaloid appearance on fresh fractured faces, despite their sedimentary origin.

At the plant site, the trucks dump into an apron feeder hopper preceding the primary crusher. Feeder, crusher, and all main operating components in the plant are Cedarapids equipment. The present primary crusher installation, which represents the latest revision made to the plant, incorporates a 3645 double impeller impact breaker that replaced an older jaw crusher. With the installation of this unit, primary reduction drive was converted from diesel to electric, a move which completed the full electrification of the plant.

The change in primary breakers made here is an example of the many instances in which a quarryman finds that his raw material cannot be processed as planned with a given type of equipment. In this case, the jaw crusher previously used was not adequately reducing the quarry-run rock, nor handling feed at the desired rate—due in large part, of course, to the characteristics of the feed. With the present unit, according to Mr. Hess, most of the crushing is now

When the property was acquired, the quarry area had already been opened, but developed without a consistent or regular pattern. The face, now straightened, is operated as a full face to a height of about 70 ft.



This tractor-mounted drill replaced older wagon-type units. The 2¾-in. blastholes are charged with standard explosives.

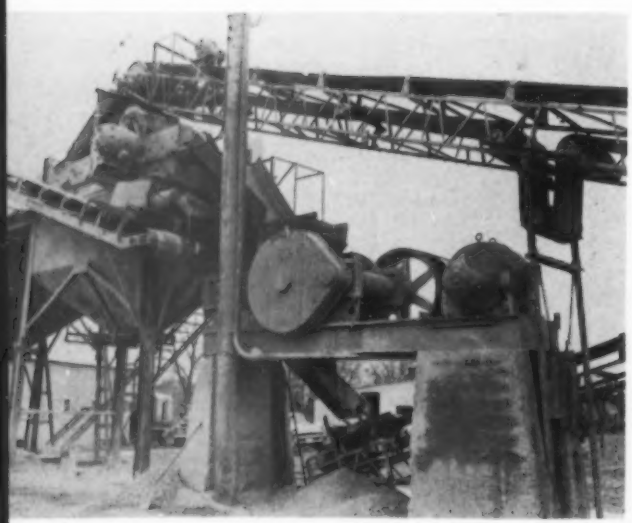
Below, left: A close-up of the primary crushing installation. Replacement of the older setup (a different type of breaker) by this unit was dictated by the nature of the quarry-run material.

accomplished at the primary stage. This advantage has not only reduced the load on the secondary crusher, but has also minimized wear on belts and screens caused by an excessive amount of oversize fragments contained in the crusher-run of the original primary breaker.

Discharge from the double impeller primary, which is powered by a pair of 150-hp. motors, now has a top size of about 3 in., received on a short horizontal conveyor for transfer to the 30-in. by 80-ft. plant feed belt. On the latter, the crusher-run feed is delivered to a 5- by 14-ft. double-deck scalping screen.

The top deck of this unit may either be fitted over the full length with ¾-in. opening screencloth, or with a split deck of 1½- and ¾-in. openings. The lower deck is fitted with ⅛-in. screencloth. Material retained on the upper deck is chuted to a 40 x 24, 200-hp. roll crusher for secondary reduction, and products of the latter are transferred on a 24-in. return conveyor to the scalper feed belt in closing the secondary crushing circuit.

Minus ⅛-in. material passing the lower deck of the scalper is dropped into an underlying bin, while that retained is chuted to a 24-in. by 30-ft. conveyor leading to the second screen. This final screen, a 4- by 12-ft. triple-deck unit, is usually fitted with screencloth on only two decks, separation being made



Below left: Secondary reduction of top-deck retained material from the scalper (upper left) is accomplished with this 200-hp. roll crusher.

Below: Stockpiled finished materials are rehandled by tractor shovel.

through ½-in. openings on the upper deck, and 8-mesh on the lower.

The three products of this final sizing are chuted into the appropriate one of three underlying bin compartments. When a ¾-in. opening screening surface is used on the full upper deck of the scalper, as noted previously, the second screen is not brought into the flow.

The various products of the above processing, including primarily 1½ by ¾ in., ¾ by 1, ½ by No. 8, and No. 8 to dust, are loaded directly from the screen bins for delivery, or for transfer to stockpile. Rehandling of material from the latter for truck loading is handled by a Michigan 125A tractor shovel. The greater proportion of the plant's output, which is trucked to customers and job sites within a 20- to 25-mile radius, is delivered by contract haulers.

All phases of operation in this compact installation, and the quarry, are handled by an 8-man crew. C. D. Hess, owner-operator, is looking forward to the time when his young son will become an active participant, as forecast in the firm's name.

Revamping Utah P.C.

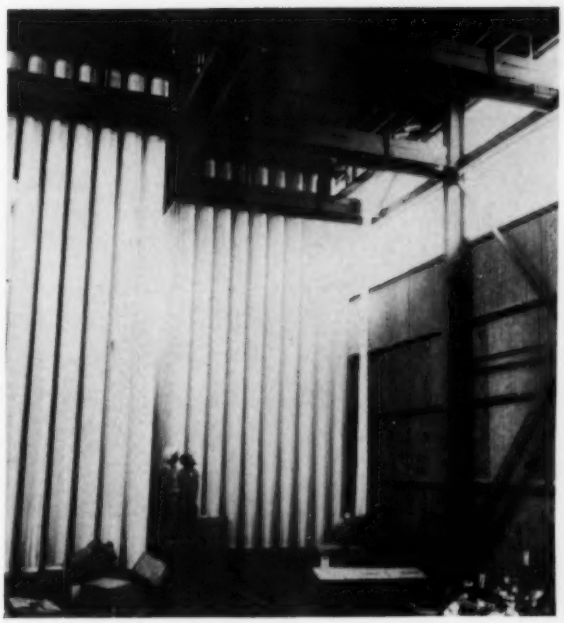
(*Continued from page* 87)

plated include four more finished-cement storage silos.

The quarry supplying the plant contains an ideal raw material in the form of an argillaceous cement rock. It is situated at the mouth of Parley's Canyon, about 12 miles east of the plant, which itself is only about 2 miles from downtown Salt Lake City. Formerly, minus 4½-in. stone was trucked to the plant for secondary reduction. Recently, a complete, modern crushing department was installed at the quarry to bring the stone down to minus ½-in. mill-feed size. Equipment includes an Allis-Chalmers primary gyratory crusher, followed by a Pennsylvania reversible impactor with an Allis-Chalmers rod-deck screen in closed circuit with the impactor.

The company was under the management of the Snow family for many years until recently, when Seaton Prince, prominent Salt Lake City attorney, was elected president. Edwin S. Gallacher is secretary-treasurer and production manager. Charles Howe, a veteran of 27 years' service with the company, is chief engineer and superintendent. Harold Buchanan is the quarry foreman.

The high concrete supports for the new 10- by 300-ft. kiln, during construction. The old 185-ft. kilns appear at the left.



This is an interior view in the dust-collection bag-house, showing workmen installing the 960 glass-fiber bags. Each bag is 12 in. in diameter and 25 ft. long.

An 80 t.p.h. sand and gravel plant has been opened by the C. W. Roweth Company at a site on the Osage River, 3 miles south of Wardsville, Mo. Four sizes of washed materials are available—ranging from sand and pea gravel to 1-in. concrete aggregate and other 1-in. plus material.

"Safety in the 'Sixties"— Theme of 47th National

Informative addresses heard in sessions of Cement, Quarry, Mineral Aggregates Section

By JAMES G. KOSTKA

ANOTHER ON THE SPOT REPORT

MAKING the next decade safer than the past was the dedicated objective of the 47th National Safety Congress and Exposition held in Chicago from October 19 to 23. This was brought out by the theme of the meeting, "Safety in the Sixties."

The Conrad Hilton Hotel served as both the Safety Congress headquarters and the exhibit location for close to 200 different safety equipment manufacturers. Sessions were held in seven hotels, including the Hilton, and these sessions required over 600 speakers. Our coverage took in all the Cement, Quarry and Mineral Aggregates sessions, plus one mining session.

Safety Program Of New York Trap Rock

Seymour B. Fleming (safety director, New York Trap Rock Corporation) was the speaker at the mining session we attended. The title of his speech was *New York Trap Rock Corporation's Accident Prevention Program.*

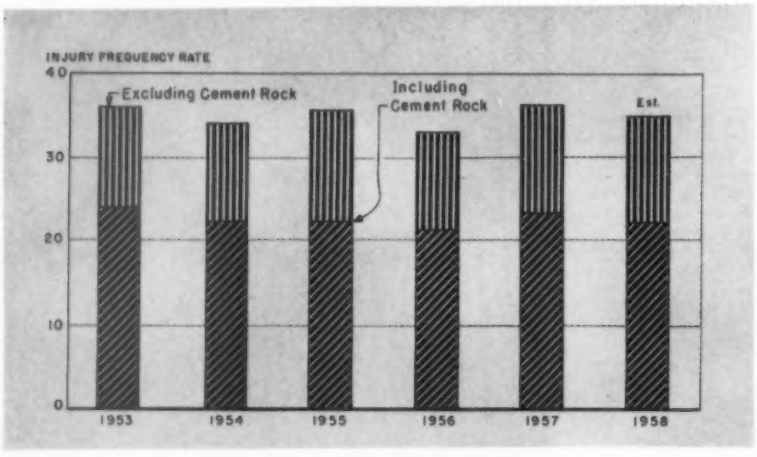
In his talk, Mr. Fleming pointed out that his company is constantly trying to make improvements that will lead to safer operations. One of the big strides along these lines was their preparation of a safety manual, which states the safety objectives of the company and specifies the group to which each person within the organization belongs. It also identifies the administrative bodies responsible for safety rules and regulations throughout the organization.

The feeling of New York Trap Rock Corporation is that no man's job is so important and no service so urgent that time can't be taken to perform the work safely. Plant superintendents and their assistants are responsible for safety supervision and the workers' attitude on safety.

Prior to employment, each job applicant is given a physical examination and chest X-ray. The doctor decides whether to recommend the employee or not. If there is a question about the applicant's health, the matter is turned over to the director of safety, who makes the final decision.

Safety is a matter of prevention and control. Good housekeeping is a part of every job, and it helps to prevent accidents. Keeping an area clean, putting tools away, etc., are considered safe practices and time saved. Good housekeeping should become a regular part of the job.

Safe practices at New York Trap Rock do not stop with the employees. All persons on the property, even visitors, are compelled to wear hard hats. Plans are also being made to require all persons in the



The average injury frequency rate for the nation's stone industries shown with and without the cement rock sub-industry (1953-58).

Safety Congress

"Buying safety built into new equipment is much cheaper than adding it later," declared William A. Kipp, safety director, Universal Atlas Cement Division of U. S. Steel Corporation, during his address.

plant areas to wear safety goggles. Although visitors are not required to wear safety shoes, all plant personnel are required to do so.

Each employee operating power equipment must have a key to a safety lock on the equipment. This practice prevents unauthorized personnel from attempting to operate the equipment.

Each plant has a plant safety committee composed of all foremen and stewards, which is run by the plant superintendent. He, in turn, reports to the safety director. Two men are appointed each month to make a plant safety inspection. Their findings go to the plant safety committee. In this way safety is initiated at the lower echelon, and is not dominated by just one man higher up in the organization.

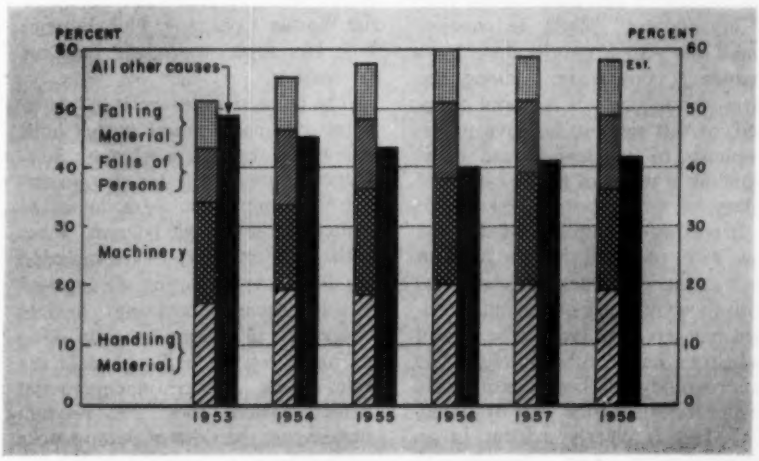
Training in safety and first-aid is given on company time. This makes the employee feel that safety is actually a part of his job and helps to make him more receptive.

Joint Luncheon The meeting of the Cement, Quarry, and Mineral Aggregates Section on Tuesday, October 20, started with a joint luncheon of this group and the Coal Mining and Mining Sections. As a feature of the luncheon, Warren H. Moss, editor of the Hanna Coal Company's house organ, gave an informative talk entitled *The Man Who Gets Paid to Worry.*

Section Report After the luncheon, Paul J. Worseck, manager, safety and welfare, Lehigh Portland Cement Company, Allentown, Pa., and general chairman of the Cement, Quarry, and Mineral Aggregates Section, gave a short report on the activities of his committee. He also mentioned that Jim Christie, of the National Safety Council, provided a considerable amount of assistance in helping to set up the program for this year.

Officers Elected Nominations were then made for the next year's committee. They were as follows: William A. Kipp (Universal Atlas Cement Co.), general chairman; Fred E. Storch (The Whitehall Cement Manufacturing Co.), first vice-chairman; Howard F. Johnston (Funkhouser Mills), second vice-chairman; and Dorse E. Seiple Jr. (Standard Slag Company), secretary. The nominations were seconded, and a vote was taken on the floor. All of the nominated men were elected unanimously.

P.C.A.'s "Growing Pains" The first speaker of the afternoon was Ivan F. LeGore, safety director of the Portland Cement Association. First he gave a brief description of how the Portland Cement Association film *Growing Pains* was made. It took about 20



Percentage distribution of four major causes of injury in the nation's stone industries, compared with all other causes (1953-58).

months from the time the idea was conceived to the time the finished film was ready. Professional actors were used because they could do a better job of playing the parts, but the settings were authentic. This film was made in the plant areas of about six different Midwestern cement plants.

This new 16-millimeter sound-and-color motion picture tells of safe job performance in portland cement manufacturing plants. It has a running time of 33 minutes and emphasizes the importance of a mature attitude toward safety among plant workers.

The central figure is a worker who learned from the example of his 11-year-old son a lesson in growing up to his responsibilities for safe conduct. By digging deep into human attitudes, rather than the mechanical causes of accidents, the story brings out the safety value of teamwork, observance of rules and instructions, discipline, and due regard for consequences. The theme is realistically and believably presented and is applicable to any situation requiring safety awareness. It is therefore suitable for showing to all groups and agencies interested in safety problems.

"It ain't the individual or the army as a whole, but the everlasting teamwork of every bloomin' soul." This was the guiding safety principle offered by John C. Machisak, chief, Branch of Accident Analysis, Division of Safety, U. S. Bureau of Mines, in his address, which stressed accident-hazard comparisons in terms of injury causes.

Accident Analysis John C. Machisak, chief, branch of accident analysis, U. S. Bureau of Mines, who in appearing on the Congress Hotel program last year was the first member of that agency to be on the section's committee in several years, spoke again at this session. "Where Are We Going?" was the query presented in the title of his address. While he concentrated last year primarily on injury-frequency comparisons among the various categories of material quarried, at this session, he gave major emphasis to accident-hazard comparisons in terms of major causes of injury.

It was again emphasized that the low rate recorded by the cement rock quarries, when incorporated with those of other quarrying activities, has served to reduce the overall industry average substantially. The latter would have been considerably higher if cement rock were excluded. This fact is clearly evident in an accompanying chart. Another industry section, lime, has also continued an encouraging improvement in injury-frequency rate reduction.

Another interesting chart, among those shown by Mr. Machisak (also reproduced here), depicts the four major causes of injury, which together account for more than 50 percent of all injuries in the country's stone quarries. These four are: handling materials, machinery, falls of persons, and falls and slides of materials or objects.

Lockouts For Safety The final speaker of the afternoon was Lea P. Warner Jr., director of public relations and safety of the Warner Company, Philadelphia, Pa. His topic was *Safe Lockout Procedures*.

The colored slides were shown to point out unsafe practices that hold potential danger to workmen. Subsequent slides illustrated the corrective measures that were taken to overcome the specific hazards. Some of the safety measures taken included the following: covering all exposed V-belt drives; covering flexible couplings; protecting a walk along a crusher with a baffle plate at the side of the crusher; placing metal ladders where they are needed; building up the sides of dump trucks so that heaped material couldn't fall off and hit some one; placing electrical switches for machinery so that they are easily accessible and in plain sight.

One novel idea was given a means of stopping a conveyor anywhere along its length. This is done by running a cable along the walk of a conveyor system, with a pin inserted in a switch which is centrally located. If some one is caught in the conveyor, he can easily reach over and grab the cable; this will pull the pin and stop the conveyor.

On explaining the lockout measures of his company, Mr. Warner explained that for all potentially dangerous equipment only one member of the crew is authorized to open the lock or close it. However, the supervisor also has a key. Limiting the keys to this equipment precludes the possibility of injury to other employees who are not authorized to start or stop the equipment.

Another rule is that only electricians can enter places where electricians are supposed to know their way around. Electricity is always potentially dangerous to those who do not know much about it; so these persons are kept at a safe distance from high-voltage operations.

Another safe practice brought out in Mr. Warner's talk was that all switches, panels, etc., should have a clean, readable label, so that no one has a chance to cause an accident by turning on the wrong switch. Labels should have lettering large enough to be seen at some distance.

Ways of Protecting New Equipment The Wednesday afternoon session of the Cement, Quarry, and Mineral Aggregates Section was opened by William A. Kipp, director of safety, Universal Atlas Cement Division, U. S. Steel Corporation. In his talk on *Safeguarding New Equipment* he pointed out that his company has a group of three men who make periodic inspections of machinery and equipment—the safety director, the operator, and the engineer. All three men must sign the inspection report on the machinery or equipment they inspect. If some unsafe practice is detected, they enter it in the report; a later follow-up inspection checks to see that the fault has been corrected.

Mr. Warner declared that buying safety built into new equipment is

much cheaper than adding it later. Because of this fact, he urged, it is well always to consider safety in buying new equipment.

Slides were shown during the last part of Mr. Kipp's talk, illustrating some of the safety precautions that have been taken by his company. One showed exhaust pipes and vents in the garage wall. These are used to expel exhaust carbon monoxide from running trucks during the winter when the garage doors are closed. Another slide showed the effective use of paint in marking a freight engine so that it could be readily seen even on a cloudy, dull day.

Another slide showed a ladder that was placed over a bearing house. Before the ladder was put there, men who climbed over the bearing house became potential accident cases, because of the chance of falling from its sloping sides. Many other interesting slides of accident prevention measures used on equipment and machinery were also shown during the remainder of Mr. Kipp's slide presentation.

Considerable interest was shown in the next talk, entitled *Field Mixed Ammonium Nitrate Blasting Agents*, by Robert W. Van Dolah, chief, division of explosives technology, U. S. Bureau of Mines. Mr. Van Dolah opened his talk by pointing out that four of the largest disasters involving explosions resulted from ammonium nitrate. The Texas City disaster was one that was mentioned and was readily remembered by everyone in the audience.

If we exclude permissibles, about 30 percent of all the explosives used today are ammonium nitrate. The explosive is easy to make. All that is needed is fertilizer-grade ammonium nitrate and fuel or diesel oil. Best results are obtained by mixing an 80 pound bag of ammonium nitrate with 3 quarts of oil. This represents about 6 percent oil mixture. A No. 2 diesel oil is most commonly used in the mixture.

To date, the accident record for fertilizer-grade ammonim nitrate explosives has been excellent. The safety factor for this product is very high because it has a great deal of stability. However, when it is detonated, it has about the same potential explosive strength as dynamite.

Although ammonium nitrate is relatively safe, it should be stored separately and treated as an explosive. This safety practice is always certain to pay dividends. There is an unfortunate association of ammonium nitrate with fertilizer as a harmless product. Because of this association, safety precautions needed with regular explosives are often overlooked with ammonium nitrate. Moisture has a direct effect on ammonium nitrate. As water is added, the sensitivity of ammonium nitrate decreases. Because of this fact, ammonium nitrate should not be kept in a damp blast hole over too long a period of time.

The final talk was given by A. B. Hoftiezer, vice-president in charge of safety, Laverack & Haines, who discussed *Fire Hazards and Their Prevention*. Mr. Hoftiezer offered several safety suggestions for preventing fires.

Oil storage houses are among the prime fire hazards. Such a structure should always have a fire extinguisher, but it must be kept near the door where it can be reached from the outside. A fire extinguisher that can't be reached is of no use.

Periodic checks should be made of oil houses to make sure no fire hazards exist in them. Keep out old, oily rags, highly inflammable substances and, above all, explosives.

Be careful where you locate your gasoline pumps. Don't put them close to a place that is enclosed, or in a spot where people congregate. Gas fumes collect in low places and enclosures. When these fumes are in a confined area, a spark could easily set off an explosion causing injuries or even death.

Check for worn-out wire in your plants. Bare wires cause shorts, and shorts cause fire. Old, worn-out wires could also give a man a fatal shock, especially if the ground were wet.

Solvents, not gasoline, should be used for cleaning machine parts. Periodic checks should be made to make sure that this practice is followed. Gasoline is highly volatile, and bursts into flame on contact with the slightest spark. Static electricity can set off the gas fumes just as easily as a flame.

Welding accidents are common when tanks containing gas or oil fumes are being worked on. The treacherous part of this operation is that a welder or cutter can work on a tank for some time without any warning or danger. Then, boom! He's blown through a wall. As a safety precaution, such tanks should be removed from the plant area.

In closing, Mr. Hoftiezer suggested that plants get rid of shanty houses where some of the men congregate to get warm. They are usually made of flimsy material and easily catch fire. The best solution to this problem is to provide the men with a suitable fireproof shelter.

This session ended the Cement, Quarry, and Mineral Aggregates Section program of the 47th National Safety Congress and Exposition. Those in attendance indicated that the addresses were highly informative and will be a great aid in their own plant and company safety programs.

"All potentially dangerous equipment should have one key, one lock, and one employee authorized to open it," according to Lea P. Warner Jr., director of public relations and safety of the Warner Company. His topic was "Safety Lockout Procedures."

For the nine months ended September 30, Ideal Cement Company reported net sales of $84,098,886 as against $71,784,267 for the same period last year, and net income of $16,209,668 against 1958's $13,584,953. Figures for both years have been adjusted to include those of the newly-acquired Volunteer Portland Cement.

Chantilly supplying 1,300,000 tons of crushed stone for new Washington international airport....from

Plant Designed for Eventual

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT REPORT

THE Chantilly Crushed Stone Company at Chantilly, Va., is supplying 1,300,000 tons of crushed stone in 1959 for the construction of Washington's new Dulles International Airport, which will give the nation's capital unequalled facilities for air traffic from all parts of the world. The plant is of unusual interest because, although it was designed to make a few specified sizes in large volume, it can also readily make a large variety of commercial sizes. The main product now is carefully graded 2-in. minus sub-base material and special sizes for concrete and asphalt are also made. The plant includes a pug mill station for the base course material; and on the site are a ready-mix plant for incidental concrete work, and a hot-mixed asphalt plant for the runway shoulders.

Even before the site for the airport was selected, the Chantilly firm had located and optioned this deposit for hard diabase trap rock with the idea of putting in a commercial plant in any case. After a preliminary investigation of the deposit a long-term lease was secured in 1958. In May of that year a Cedarapids portable crushing and screening plant was put in commercial operation. This plant was closed down for the winter on November

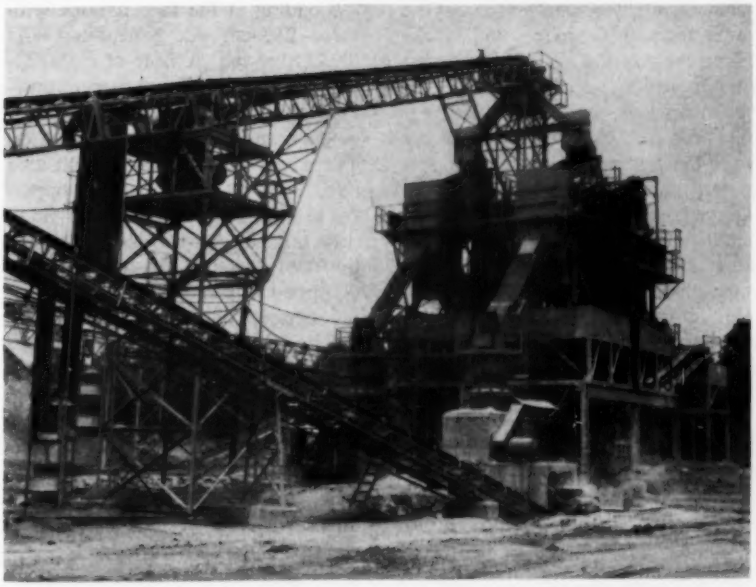
THIS VIEW SHOWS A PART of the new 900-t.p.h. crushed stone plant of the Chantilly Crushed Stone Company at Chantilly, Va., which is supplying 1,300,000 tons of stone for Washington's new Dulles International Airport. Primary and secondary crushing departments are at the left. At the right is one of the screening towers.

Commercial Production

15. Further tests showed good rock to a depth of at least 200 ft.

In December, 1958, the contract for the airport runways was let, and the Chantilly firm got the stone contract. This was for 1,300,000 tons to be supplied in 1959, including material for sub-base and concrete and bituminous concrete aggregates. Of this total, 800,000 tons is 200-mesh to 2-in. sub-base material, and 50,000 tons is concrete aggregates in ½- to 2½-in. and No. 4 to 1-in. sizes. Also required is 50,000 tons of minus 1-in. bituminous aggregate. The sub-base material is a blend of three sizes of crushed stone —4-mesh to 2-in., 4-mesh to 1½-in., and minus 4-mesh screenings— and minus 4-mesh natural sand. These are blended in proportions of 25 percent stone screenings, 15 percent natural sand, and 60 percent of the two crushed stone sizes combined.

The $75,000,000 airport is at Chantilly, 3 miles from the plant. It will replace the present Washington National Airport, which is too close in and much too small for the large new commercial jet planes. The new airport covers 9,000 acres and is on U. S. Highway 50, 25 miles west of downtown Washington. A dual superhighway will be built to provide quick access. Three runways are now being built; two running north and south are each 11,500 ft. long, and one east and west is 10,000 ft. long. There will be a 9-in. sub-base under these runways, their taxi-ways, and the six crossovers. These are 75 ft. wide,



THE FINAL SCREENING TOWER, with conveyors to stockpiles for stabilized road base (left) and the aggregate loading conveyor (right). The two tertiary crushers are in the foreground.

THE STOCKPILES from which different sizes are blended by reclaiming tunnel conveyor to the stabilized road base plant (right).

with 50-ft. shoulders. The runways will be 12- to 15-in. thick unreinforced concrete. The shoulders will be asphalt, with 4½-in. thick subbase.

As the plant would be called upon for up to 9,000 tons per day of several sizes, it was decided to design for a capacity of 900 t.p.h. Operating 11 hours daily, there has been no difficulty in keeping up with demand. This plant is simple but flexible, which makes it possible to adjust the volume of various products made to the needs. Output has been concentrated on the four sizes needed for sub-base, at the same time also making and stockpiling some of the sizes to be needed for the cement and bituminous concrete runways, shoulders, etc. Now that the sub-base work is nearly completed, output is being concentrated on surfacing material, and more commercial sizes are being made and stockpiled. The experience gained in operating the temporary plant gave the company valuable information on the deposit and the best processing methods.

Quarry The overburden, which averages 4 ft. in depth, is removed by shovels and trucks. The quarry face now averages 37 ft. in height but will eventually be 50 to 60 ft. Drilling is done under contract by the York Drilling Company, York, Pa., using three Ingersoll-Rand Drillmasters with 5-in. bits. In this hard rock each drill averages six 34-ft. holes in 14 hours. DuPont Gelex 40 percent explosive is used, and firing is done with up to four delays.

Only a moderate amount of secondary breaking is necessary, and this is done with a 6,500-lb. Cape Anne dropball operated from a ¾-cu. yd. Lorain truck crane with a 45-ft. boom.

Loading at the face is done with three 2½-cu. yd. Northwest 80D diesel shovels. A fleet of eight 22-ton Euclid end-dump trucks, powered by General Motors diesel engines, hauls to the primary crusher. There the trucks dump from two sides into a 27-ft. square hopper. From this hopper the stone flows into the No. 42-65 Allis-Chalmers Superior gyratory crusher, which is equipped with the Hydroset hydraulic opening control.

The clean, well graded natural sand used in the sub-base mix is a part of the overburden. It is also loaded into trucks and is discharged through the primary crusher into the system.

GENERAL VIEW OF THE QUARRY, with drills in the background, one of the three shovels loading trucks, and the truck crane and drop ball breaking large rock.

Plant The minus 5½-in. crushed rock and sand is discharged from the crusher into a box which breaks the fall onto belt conveyor No. 1C. This 42-in. by 70-ft. conveyor discharges on 42-in. by 200-ft. conveyor 2C to the scalping and secondary crushing station. The stone is discharged *via* a split chute to a pair of 6- by 14-ft. Tyler Ty-Rock 2-deck screens. These have 2½-in. spaced steel bars on their top deck to protect the wire cloth on the bottom decks, which have one section of 2-in. and two sections of 1¾-in. cloth.

Minus 2-in. material through these screens is carried on 30-in. by 74-ft. belt conveyor 3C to a screening tower. There it is split to a pair of 5- by 14-ft. Ty-Rock 1-deck screens with $\frac{5}{16}$-in. cloth. The minus 4-mesh undersize is largely native sand and this is discharged by a 24-in. by 66-ft. belt conveyor (4C) to a 6,000-ton capacity stockpile over the reclaiming tunnel.

The 4-mesh to 2-in. oversize from these screens is carried on 24-in. by 77-ft. belt conveyor 5C to a second 6,000-ton stockpile over the tunnel. Under these screens are two 40-ton steel bins from which trucks can be loaded for delivery or for separate ground storage.

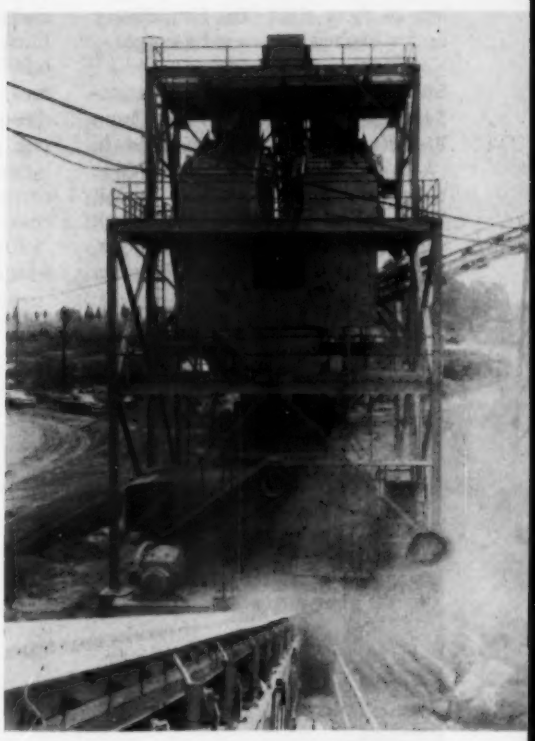
The 2- to 5½-in. oversize from the primary scalping screens is chuted to a No. 84-17 Allis-Chalmers Hydrocone crusher. The minus 3½-in. product is carried on 42-in. by 233-ft. belt conveyor 6C to the final screening and tertiary crushing station. There the stone is split to the first of two pairs of 6- by 14-ft. Ty-Rock 3-deck screens with 2½-,2-, and 1¼-in. wire cloth.

Oversize off one or more decks, as desired, is chuted to a pair of No. 751 Hydroset crushers. Their ¾-in. minus product is carried on 30-in. by 32-ft. cross conveyor 11C which is in a concrete tunnel. This tunnel discharges on a 30-in. by 118-ft. return belt conveyor (12C) which discharges back on conveyor 6C, forming a closed circuit.

The two intermediate sizes made on these screens—2- to 2½-in. and 1¼- to 2-in.—usually drop into four 40-ton steel bins under these screens.

Undersize — minus 1¼-in. — is carried on 36-in. by 33-ft. twin conveyors 14C and 15C to the second

TWO of the eight 22-ton trucks discharging to the primary crusher hopper. The clamshell crane is feeding natural sand through the primary crusher into the plant flow.



CRUSHING STATION (scalping and secondary), with two bar-deck screens above and the secondary crusher below.

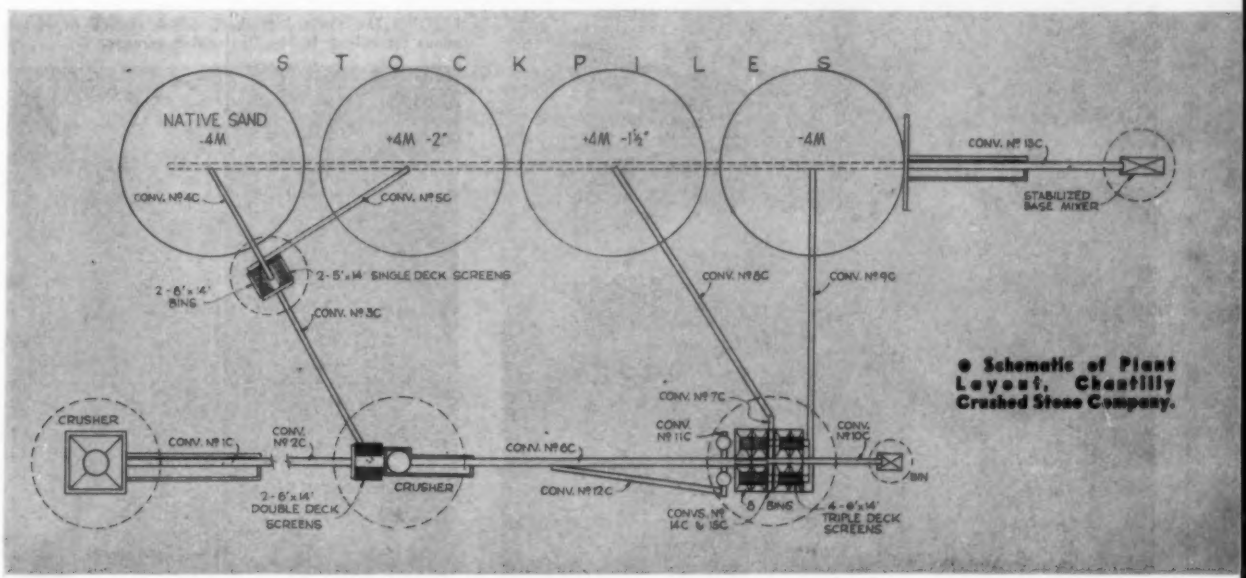
pair of 6- by 14-ft. Ty-Rock 3-deck screens. These are equipped with 1-, ½-, and 3/16-in. wire cloth. The four sizes made are discharged direct to four 4C ton bins under these screens.

A 24-in. by 104-ft. horizontal belt conveyor (10C), running lengthwise between the two rows of four bins each, can draw through side chutes from any one or any combination of them. This conveyor discharges to a separate 40-ton truck loading bin, and the material can be hauled to storage or delivered. This arrangement is being used for the No. 4 to 1-in. and ½- to 2½-in. concrete aggregates, and the minus ½-in. asphalt aggregates for the airport and for commercial demands.

A horizontal cross conveyor between the second and third pairs of bins is being used to blend 4-mesh to 1½-in. sub-base rock. This 24-in. by 34-ft. conveyor (7C) discharges on a 24-in. by 153-ft. stockpiling conveyor (8C) which in turn discharges to the third 6,000-ton stockpile over the tunnel.

Another stockpiling conveyor, 24-in. by 161-ft. conveyor 9C, takes minus 4-mesh screenings from the fourth pair of bins to the fourth 6,000-ton stockpile over the tunnel.

Trucks can also be loaded under



● Schematic of Plant Layout, Chantilly Crushed Stone Company.

any of these eight bins for delivery or for haulage to ground storage.

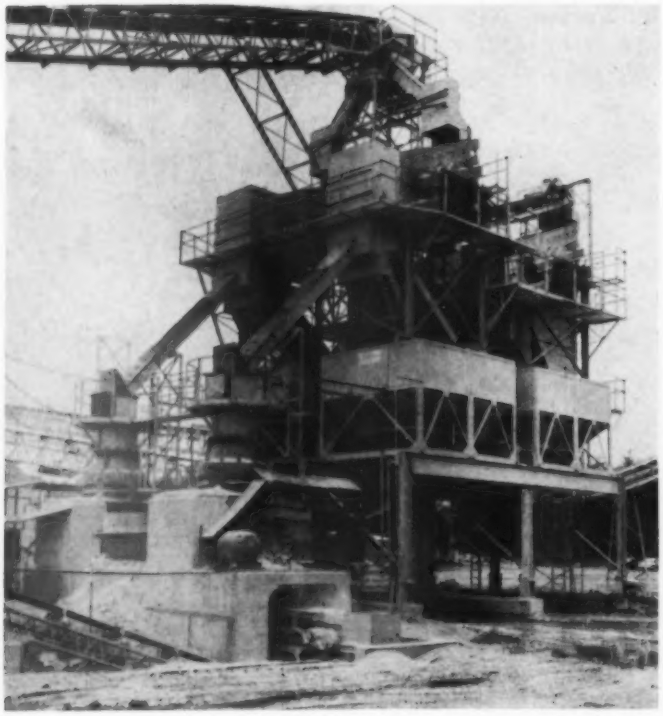
Sub-base Storage and Blending The sub-base material, as has been stated, is stored in four stockpiles over a reclaiming and blending tunnel. These piles contain minus 4-mesh sand, 2-in. to 4-mesh crushed stone, 1½-in. to 4-mesh crushed stone, and minus 4-mesh stone screenings. Each pile has a capacity of about 6,000 tons, of which about 2,000 tons is live capacity reclaimable through two openings under each pile. The tunnel is 400 ft. long and is made of 9-ft. diameter Armco corrugated metal culvert pipe, with concrete walls, floors, and ends.

Reclaiming and blending of these four materials is done by two Syntron vibrating feeders under each pile. The blended material is discharged on reclaiming conveyor 13C (36 in. by 478 ft.). This conveyor is inclined out of the tunnel to the pug mill station. The material is discharged into a 4- by 9-ft. Cedarapids dual-shaft pug mill, where enough water is added to give a 5 to 6 percent moisture content. The finished product goes to a 5-cu. yd. draw hopper from which trucks are loaded. These haul about 3½ miles to the airport, most of the distance on paved highways. This department has a capacity of 500 t.p.h.

A laboratory building at the pug mill station houses equipment for making tests of the sub-base material, as well as the usual aggregate quality and control tests. Complete field equipment includes a sieve shaker, coarse screens for samples, moisture testers, electric stove, etc.

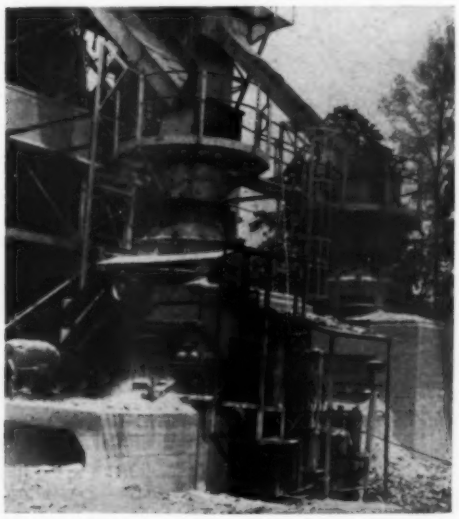
All deliveries to date have been weighed on a 50-ton Fairbanks-Morse truck scale. Each of the four stockpiling conveyors is now being

THE SCREEN TOWER, showing one pair of screens separating natural sand from rock for discharge to the bins or to stockpiling conveyors. One end of the 400-ft. reclaim tunnel is visible.



THE FINAL SCREENING TOWER has two pairs of screens, two tertiary reduction crushers and conveyors. Products can go to truck-loading bins or to stockpiling conveyors for stabilized road base, or they can be blended on the truck-loading conveyor (right).

BELOW: The tertiary crushers, which reduce to ¾-in. minus for return to the final sizing screens.



equipped with a Fairbanks-Morse conveyor scale to record sub-base material output. Other products will then be weighed on the truck scale.

Plant Control Electric power is received at 2,300 v. from a utility company transformer station on the premises. A company transformer station reduces this to 440 v. for all equipment except the four 2,300-v. crusher motors and to 110 v. for lights. The entire plant up to the tunnel reclaiming system is controlled by one man at the switchhouse who keeps in contact by signals with the primary crusher station and the final screening tower. The pug mill operator controls the withdrawal of materials from the stockpiles, the blending, pug milling, and loading out of the sub-base material. The property is floodlighted for night operation.

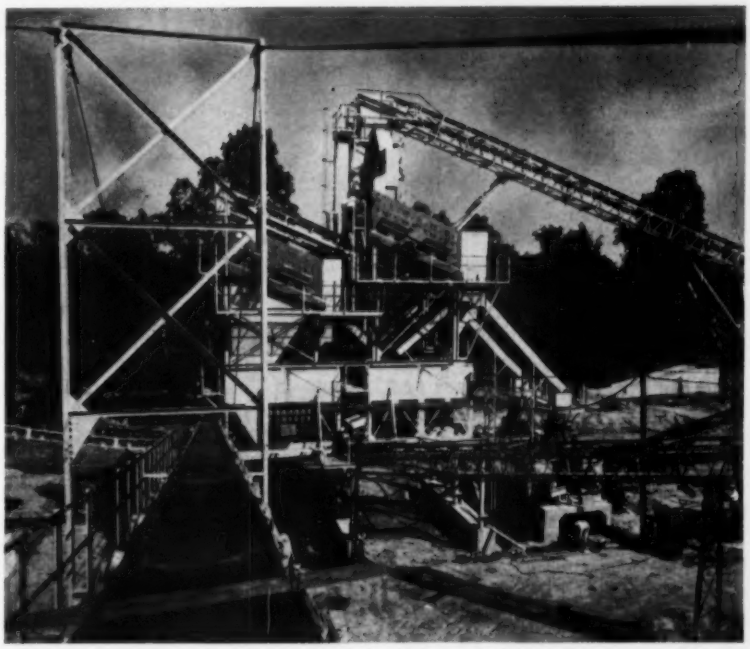
Dust Control The dust necessarily created in such a large crushing and screening operation is being effectively controlled by the Johnson-March system of dust control. This consists of sprays at the points of dust creation, which apply the necessary amount of wetting agent without making the material too wet for screening and crushing. The MR compound used is proportioned and mixed—1 part to 700 parts of water—in a proportioning and mixing unit alongside conveyor 1C near the primary crusher. Water is supplied by a sump pump under the crusher to a 16,000-gal. storage tank which also supplies the crusher cooling water.

The spraying system is a continuous line to the various points, with excess going back to the solution pump. Pressure averages 80 lb. at the sprays. Spray bars are located over conveyor 1C at the primary crusher discharge, at the top of the secondary crusher, over conveyor 6C at the secondary crusher discharge, under the two tertiary crushers where they discharge on conveyor 11C, and at the discharge boxes where screenings come off the final pair of screens.

This system uses about 700 g.p.h. of this solution, at a compound cost of about $3 per hour, to keep down dust for this 1,100-t.p.h. operation. The spray system has solenoid controls and needs little attention, but the proportioning and mixing unit is checked at intervals for proper adjustment. There is no need to cover any of the belt conveyors, even in this windy location, as the treated material holds well on the belts and does not dust.

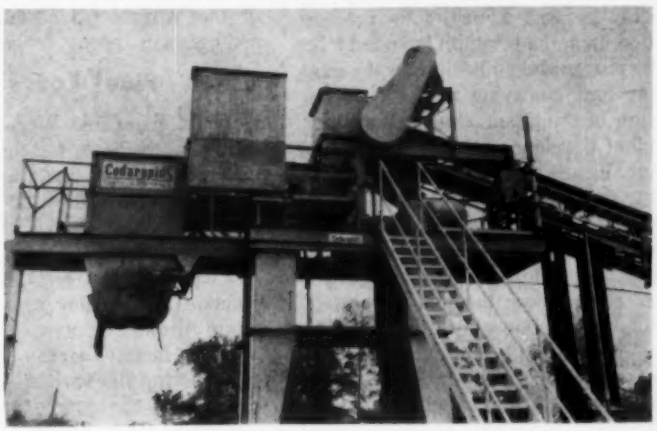
Credits L. B. Smith, Inc., of Camp Hill, Pa., co-operated with the company on the design of the plant, supplied most of the equipment, and fabricated all the structural steel, including conveyor and stacker frames and bins. The conveyors are equipped with Cedarapids idlers and pulleys and Goodrich conveyor belting. Except for conveyors 2C and 4C, which have wrapped drives at about mid-point, they are driven at their head pulleys through Falk speed reducers by Crocker-Wheeler motors. The four stockpiling conveyors are of the cantilever type, supported at their discharge ends by cables.

(*Continued on Page* 111)



ANOTHER VIEW OF THE FINAL SCREENING TOWER, which shows the arrangement of screens, conveyors, and crushers.

THE STABILIZED BASE MATERIAL INSTALLATION, with the dual shaft pug mill, and the truck-loading hopper (left).



THE GROUP IS WELCOMED to the opening session by B. L. Corson, president, G. & W. H. Corson, Inc., who headed the arrangements committee.

N. L. A. Operators'

Basic factors in quarrying, kiln operations, hydration, finances, materials handling, safety analyzed

By BUREN C. HEROD

ANOTHER ON THE SPOT REPORT

A PROGRAM scheduling subjects running the gamut from phases of quarry operation to packaging and palletizing of finished materials proved to be a lodestone for nearly 160 representatives of American, Canadian, and foreign lime producers attending the recent operating meeting of the National Lime Association. Held at the Sheraton Hotel, Philadelphia, Pa., October 1-3, the meeting added further lustre to the record of interest and growing attendance established in preceding sessions of this group.

Along with individual papers and panel discussions on operating problems by well known lime production men, the program included talks by recognized authorities in the mining and quarrying fields, a discussion of the financial aspects of lime plant development, and an interesting illustrated narration presented by the association's general manager, Robert S. Boynton, on his recent tour of European lime producing facilities. Another highlight, as always, was the presentation of the annual safety awards.

A regularly scheduled feature of these operating sessions—plant tours—took the group this year through operations of two of this country's most historic lime producers—the Plymouth Meeting, Pa., plant of G. & W. H. Corson, Inc., and the Cedar Hollow plant of the Warner Company.

Rounding out the business part of the program were social events that included the annual group dinner and a number of theater parties.

Another outstanding job was done by the operating and arrangements committees. The former was comprised of C. C. Addams (Marblehead Lime Co.), chairman; M. A. Rikard (Southern Cement Co., division of American-Marietta Co.); and Robert Boynton. B. L. Corson (G. & W. H. Corson, Inc.), and John Junkin and Lea Warner (both of the Warner Co.) made up the arrangements group.

Plant Tours

The Corson and Warner organizations were hosts for the tours of their respective operations noted above, as well as for a luncheon between the visits to the two points. A number of interesting activities and features were witnessed at both plants. The morning tour took the group through Corson's Plymouth Meeting facility. Here, in addition to observing the various production phases and the quarry, the visitors witnessed a demonstration of pavement construction involving Poz-O-Pac.

The latter is a road-building material composed of lime, fly-ash, and other aggregate constituents which are combined according to a patented formula. Excellent durability is an already proven characteristic of this economical paving material, as attested to by its use on runways for jet aircraft. It was developed by the Corson laboratories in conjunction with a Philadelphia utility.

A particularly interesting period was spent in passing through the departments of the Corson laboratories, where highly diversified studies are in progress ranging from lime hydration to storage battery developments. After visiting this research center, plus the lime kiln feed preparation phase, the vertical kilns, and the hydrator, the group was taken into the extensive quarry area.

Here, operations are conducted on four 45-ft. branches with five 80D Northwest shovels and a fleet of Euclid and Mack trucks, at the rate of 8,000 t.p.d. An interesting sidelight concerns blasting, in which the maximum deflection allowed by state law is .03 in. Not only is blasting controlled to remain well within that tolerance, but consideration has been given to the welfare

Session

AN HONORED GUEST, Hermann Lange, director, Hohenlimburger Lime Works, Hohenlimburg, Westphalia, West Germany, was introduced by Robert Boynton, N.L.A. managing director. Herr Lange has served since 1946 as president of the German Lime Association.

of a nearby radio transmitting station—no shooting is done at times of scheduled commercials!

Following the luncheon, Warner's Cedar Hollow plant and quarry were toured. This facility, another outstanding example of the industry's production "muscle," also has an impressive quarry operation, in which the crushing department is centrally located on the quarry floor. A major difference in lime production, however, lies in the type of calcining equipment. The Warner plant incorporates two rotary kilns — an older 8- by 150-ft. unit, and a more recently installed 9- by 300-ft. calciner.

In the quarry, which has a record of 8 years without a lost-time accident, a pair of 2½-cu. yd. shovels load 17-ton Easton side-dump trailers for haul to the crushing department. At the latter point, primary and secondary reduction is handled by a 48- by 60-in. Traylor jaw, and a 5½-ft. Nordberg cone crusher, respectively. Subsequent screening, in circuit with the secondary, provides a ¾- by 1½-in. kiln feed.

Interest of the visiting producers in the overall kiln operation was particularly drawn to the preheating and cooling of the feed and the product. (See also PIT AND QUARRY, November, 1958, p. 93.) Both kilns are equipped with planetary coolers of Warner design.

HOSPITALITY of the Warner Company is extended by John Curtin Jr., president (with microphone), as the operators tour the Cedar Hollow operation.

Materials Handling, Packaging

Augmented with slides and models, a discussion on new models in packaging and materials handling presented by Alfred A. Roetzer, engineer with St. Regis Paper Co., dealt with such objectives as meeting the needs of lime producers on the basis of their particular requirements, cleaner bags and bagging, equipment improvement, and economical palletizing. The goal of automation provides a backdrop for all these objectives.

Noting that a current equipment development program involves research on flow of materials in bins, feeders, etc., Mr. Roetzer pointed out that improvement of present equipment, as well as study of new bag filling principles, should be undertaken.

Recently developed equipment improvements include a filling spout seal (eliminating product "squirt"), and pushbutton operation for bag tip-off. These can be applied to bagging units now in use. Automation of bagging operations has also been furthered by the introduction of equipment that will deliver bags from a storage rack to the fill spout at rates up to 30 bags per minute (either pasted or sewed valve bags).

Investigations of new packing

principles has led to fluidizing of material in the feed bins, it was noted, plus development of force flow packers. These have the advantages over earlier models of low headroom requirements and elimination of impellers.

Pallets and automation of palletizing have been subjects of considerable study, Mr. Roetzer indicated. Apparently, most producers prefer low-cost non-return pallets with capacities of 3,500-4,000 lb., weighing about 10 lb., and providing 2-way entry. Expendable pallets seem to be popular; and a variety of paper-board units are presently in development and being studied in field applications.

Drilling and Blasting

Discussions on drilling and blasting were kicked off by Dr. B. J. Kochanowsky, professor of mining engineering, Penn State University. This speaker gave an interesting slide-illustrated commentary on incline drilling and portable crushing in quarry operations. Blasting results from drilling at varied angles in different types of quarry face or exposure were tabulated in terms of yield, powder consumption, effective breakage, and other critical factors.

In the speaker's experience and studies, several advantages accrue to inclined blasthole drilling. These include better fragmentation, elimination of the toe problem, minimizing of the need for secondary blasting, less back break, and increased bench height. In brief comment on the use of portable crushers in quarries—a procedure which he has advocated for some time—Dr. Kochanowsky described and showed slides of several such installations in Europe. These involved crawler-mounted assemblies of considerable size which moved with and were directly fed by quarry shovels, and which could discharge by belt conveyor to haulage units of field conveying systems.

Further discussion of drilling and blasting was continued by a panel comprised of Joseph Pinto Jr. (National Gypsum Co.), Pat Coore (Warner Co.), and William Cobb (Batesville White Lime Co.). Russell Hunt (Southwest Lime Co.) was the panel moderator.

A description of the underground mining operations with which Mr. Pinto is associated included the mention of a 75-ft. thick limestone formation dipping 76 degrees. Horizontal development drifts along the strike are pushed by drilling and blasting 32-hole rounds. These are followed by man raises, established from drilling and blasting 17-hole rounds, cross-cuts, etc. Sub-levels are opened up with a similar development pattern. Stope drilling of 300-ft. stopes is carried out between man raises for production blasting. The bulk of this drilling utilizes diamond bits which have averaged more than 5,000 ft.

Noting that blasting is one of the biggest problems in mining operations such as that described by Mr. Pinto, Mr. Coore pointed out that it became necessary to use three detonators per 100 plus ft. of long hole drilling in the Warner Bellefonte mine.

Importantly, each round is loaded and blasted by the *same* crew, which minimizes error and oversight in loading or misfiring. Each staggered round is loaded with specially packed 1¼- by 24-in. 60 percent dynamite (80 percent was found too fast, and 45 percent too slow) and is not stemmed. Detonation is through Primacord actuated by *one* main switch at the *surface*. Experimentation has led to millisecond blasting in both development and long hole drilling. (Objectionable vibration has been kept down by using not more than 125 lb. of powder per delay.)

A third underground operation, based on the conventional room-and-pillar system, was described by William Cobb (Batesville White Lime Co.). In this development, which has 45-ft. wide rooms, and 50-ft. wide pillars, headings are advanced by drilling and blasting 72-hole patterns. Jumbos are used for both drilling and loading, the latter involving standard dynamite.

SAFETY TROPHIES AND REPRESENTATIVES of winning operations (left to right): Group A1 trophy, accepted by Verne Coffman, U. S. Gypsum Co.; Group C trophy, accepted by John Lanham, Marblehead Lime Co.; and Group A2 trophy, accepted by Wallace Wing, Marblehead Lime Co. At the right is Ken Gutschick, N.L.A. staff, with the Group B trophy, won by Mississippi Lime Co.

Underground Openings

"We have a problem," said Dr. Robert H. Merrill, physicist, U. S. Bureau of Mines, in prefacing his comments on factors that influence the design of underground openings in limestone. In essence, the problem is this: since more and more limestone will be extracted by underground methods, operators are faced with the questions of how large openings can be made with adequate safety, and how costs can be kept within economical limits.

Most limestone formations fall into two categories, it was noted,

i.e., massive, or thinly bedded. Each type presents problems for design of openings. In the former, the roof divides more readily along planes of horizontal weakness as rooms are widened. In any case, tensile stresses are involved, and these stresses increase as the roof span is increased. This situation, of course, directly affects the size of opening that can be established; and the design span of projected openings will vary directly as the square root of the strength of the material.

It was suggested that the operator obtain laboratory determination of the strength of his material and also carry out careful core drilling and obtain core analyses to find any planes of weakness in the formation.

Pillars also have complex stresses, it was noted. Whether square or rib, and on regular or staggered spacing, pillars hold the same load. In the room-and-pillar system, the central pillars have the same stress as rib or barrier pillars. For any room-and-pillar system, it is necessary to establish the safe roof span limit before the area to be left in a pillar can be determined.

According to Dr. Merrill, research on underground developments has shown that careless or casual blasting procedures can damage the roof design. Further, the stability of a given opening in terms of time is not yet known.

European Operations

According to Robert Boynton, N.L.A. general manager, his tour of European lime operations proved to be more informative in the area of West Germany than in any other country visited.

Many differences were found between domestic and foreign operations, particularly on such points as fuel, types of calcining equipment, wages, lime quality, etc. Fuel efficiency is an especially important factor in kiln design since the basic fuel—coke—costs $23 per ton. This type of most readily available fuel has also influenced kiln design. Very few rotary kilns were seen, but a number of Priest, Azbe-type, and other vertical units were in evidence. In West Germany most of these were mixed-feed units.

A lower degree of mechanization is a significant factor in the wage picture; and with respect to quality of lime produced, this is affected by the fact that most available limestone formations contain clay seams. Flotation systems are generally employed to remove this contaminant.

Among the slides shown in illustration of the various plants visited were a number taken at two Ruhr operations which are reported to be the largest in the world. These showed some modern Seger kilns that are 90 ft. high and 14.8 ft. in diameter with linings 2 ft. 7 in. thick. Fired with 11,800 B.t.u. coke, these units have thermal efficiencies of 79-85 percent, and produce 253 t.p.d. of lime (1½ tons per sq. ft. of kiln area) with a B.t.u. consumption of 1,500-1,600 per lb. of finished product. Waste gas temperatures range from 194-258 degrees F., and the kiln discharge, averaging 93 percent available lime, is quite cool.

A significant feature in these operations, due in large part to the raw material and other physical operating requirements, is the constant sampling and testing of material in various stages.

Kiln Evaluation

The installation in May, 1958, of two rotary kilns at Apex, Nev., by United States Lime Products Division of the Flintkote Company and their subsequent operations, were described by John MacDonald, resident manager, in an operating evaluation of the K-VS kiln system.

Both of the 10- by 150-ft. kilns, together with preheaters, coolers, and auxiliary equipment, were designed by the Kennedy-Van Saun organization. To date, both production (well over 200 t.p.d.) and fuel efficiency (less than 6,000,000 B.t.u.'s) have exceeded design specifications by a considerable margin. Selection of this particular equipment stemmed from two major considerations—first, to meet the quality demands of customers in a market area whose nearest major segment is some 300 miles distant; and second, to utilize minus 3-in. stone for which there was no market.

THE CHAIRMAN of the program committee, C. C. Addams (Marblehead Lime Co.), presided during the session on safety.

The latter is now reduced in a conventional crushing and screening installation to provide a kiln feed of about 1¾ by ⅜ or ¼ in. This is placed on a surge pile from which it is withdrawn *via* reclaiming tunnel vibrating feeders (which permit blending to a uniformly-sized kiln feed), and conveyed to the respective 200-ton kiln feed bin above the preheater.

The latter, one of the principal elements in the K-VS system, receives kiln gases directly from the kiln dust hood at about 1,750 deg. F., and there is direct counter-flow contact between the stone and the gases. The latter are exhausted by a 200-hp. I.D. fan at about 450 deg. F., and the stone is delivered into the hopper of a gravity feed pipe on a remotely-controlled variable-speed reciprocating feeder at a temperature of 1,600 deg. F.

Nearly 10 percent of the work of calcination has already been accomplished by the time the stone enters the kiln, and as an added advantage, it is much less abrasive on the kiln lining. The bed of stone undergoing preheating also acts as a dust collection medium, and stack dust is often barely perceptible. As an indication of the efficiency of the preheating, a jump of 2,000,000 B.t.u.'s was recorded during a period last winter when a seized bearing on an I.D. fan forced a temporary transition to natural draft.

The kilns are gas-fired and lined throughout with Gladding McBean refractory brick. Two refractory dams are provided—one at the discharge end, and the other about 40 ft. back. A 100-hp. fan with each kiln provides both primary and secondary air— the latter first used to

cool lime before entering the kiln. Instrumentation and controls for all phases are centralized on the firing floor, and operations require only a 3-man crew on day shifts, and a 2-man crew on night and week-end turns.

Lime discharged from the kilns enters the contact coolers at 2,200 deg. F., and is in turn discharged from the coolers at about 200 deg. F. *via* variable-speed screw conveyors. As stated by Mr. MacDonald, the coolers are compact and efficient, recovering in excess of 90 percent of the heat from the quicklime.

Compactness is also an impressive characteristic of the overall plant, which is described as being laid out in the shape of a "U." The distance from the primary crusher to the final quicklime storage bins is only 300 ft., it was noted.

A DEMONSTRATION of pavement construction, utilizing a lime-fly-ash-aggregate material, was provided the group during the tour of the Corson plant.

Hydration

With W. A. Roberson (Chemstone Corporation) as moderator, a panel comprised of John MacDonold (U.S. Lime Products Div., Flintkote Co.), Walter Walker (Marblehead Lime Co.), and Cecil Koger (Southern Cement Co., Div. of American-Marietta) discussed hydrate operations at the various plants of these firms.

Referring to the Nelson, Ariz., plant of U.S. Lime Products, Mr. MacDonald pointed out the change in hydrate operations which had formerly been fed with vertical kiln lime, and are now supplied by a short rotary unit. In early operations with the present installation, trouble was encountered with the high-calcium lime delivered to the mixer. Apparently, quick reaction time was at the heart of the difficulty.

Several steps were undertaken to correct this situation and other problems of the early run-in. These included slowing down the kiln to provide a somewhat harder burned lime, changing to a finer mixer feed, speeding up the mixer, and adding water in a solid stream. Draft was also increased, as well as the speed of the Raymond mill used in the process.

The use of an aging tank was a later step; and in line with growing market demands, this procedure was expedited by subjecting the lime to sprays in the cooler before it is delivered to the aging tank.

In the Marblehead operation described by Mr. Walker, hydration of high-calcium lime, primarily for chemical markets, involves a Kritzer hydrator, pulverizer, and separator. The flow delivers a product of which 99 percent passes 200-mesh, and in the process, major control effort is directed toward fineness, CaO content, and moisture.

With respect to dolomitic lime, this is pulverized to minus 6-mesh before being delivered *via* poidometer to the mixer and into the pressure cylinder, which carries steam at 70-80 p.s.i. Comment on control of plasticity of high-calcium type "S" hydrate indicated that this is provided by ball-milling.

Some of the details of a new hydrate installation at Southern Cement's Roberta, Ala., plant were presented by Cecil Koger. This installation, placed in operation last spring, is a 25 t.p.h. facility, and was designed and developed by Southern in collaboration with the Knibbs & Thyer organization. It was preceded by a small 7-t.p.h. unit built in 1951, with which operating data were developed that led to the larger equipment.

Primary objectives in the background of this development were born in the varied market requirements and included the goal of high production with minimum cost; flexibility; the ability to produce high-grade chemical material, food grade product, and building hydrate for both masonry and white-coat plaster; and production of an adequate tonnage of high-calcium type "S" hydrate with a high plasticity rating for captive consumption in prepared masonry cements.

In brief, the desired end product determines the type and grade of pebble lime delivered from appropriate storage bins to the hydrator. This feed is *via* a weigh feeder interlocked and synchronized with a water flowmeter. Hot milk of lime received from a washer-preheater is delivered to a premixer simultaneously with the quicklime, and the two are intimately mixed before entering the main body of the hydrator.

Substantially more water enters the process than is required for complete hydration, and therefore much of the reaction occurs in liquid water with consequent benefit to hydrate quality, Mr. Koger pointed out. Discharge from the hydrator is over an adjustable weir which also fixes the level of lime in the vessel. Fully hydrated material, as a powder, overflows the weir, while the relatively coarser and more dense partial hydrate tends to remain in the lower part of the unit.

Ammeters on the premixer and the hydrator give excellent indica-

tion of hydration conditions—with the correct amount of water, drive motor load is lowest, while "dry" hydration is indicated by a sharp rise in amperage, and conditions can be corrected before unhydrated material leaves the hydrator.

Hydrate is elevated to a screen on which core or material over ⅛-in. mesh is rejected, and the clean material is delivered to a 12-ft. Sturtevant mechanical air separator for classification. Fines, about 80 percent (20 t.p.h.) of the product, are transferred *via* Fuller-Kinyon pump to a packing bin, while the coarser fraction may be sent either to a pair of Raymond mills for grinding masonry lime or to the mortar plant for use in production of masonry cement.

Financial Aspects

A basic problem in business and industry, according to R. C. Goerbing, controller-supervisor, National Gypsum Company, is the measurement of operating results in dollars and cents. A solution to the problem lies in establishing return on investment, which can actually be considered an operating summary.

Once this principle has been defined as the ratio of net profit to tangible assets, the questions arise as to what is the value of return on investment information, and how is it applied. In essence, the answers are that such data are an aid to setting up priority procedures and operations. The return on investment ratio for each process or product is a guide to its continuance, possible revision, or even abandonment.

Among the basic elements in the computation of the ratio are sales turnover and manufacturing costs. However, cautioned Mr. Goerbing, a routine current computation should not contain such financial factors as special tax deductions, since these are actually short-term borrowings.

Not only does such information allow a timely correction of a given situation when needed, but it stimulates various control procedures such as budgetary standardization of costs, labor, etc.

Safety

Preceding the presentation of safety awards, a panel comprised of E. C. Beuthin (U. S. Gypsum Co.), C. E. Baxter (Ash Grove Lime & Portland Cement Co.), and D. K. Russell (Ohio Lime Co.) discussed practical safety ideas and programs followed by their respective organizations. The moderator was Lea Warner (Warner Co.).

Basic factors in U. S. Gypsum's approach, as noted by Mr. Beuthin, included employment of the best possible personnel, proper training of these people, provision of good working conditions, regular inspection of equipment and working habits, investigation of accidents, if and when they do occur, to establish responsibility (either supervisory or worker), and disciplinary provisions.

Inspection of equipment and work habits is considered especially important, and these factors are checked daily by supervisors. There is considered to be a direct relationship between foremen's contacts with the men and accident rates, *i.e.*, the more contacts, the fewer accidents.

According to Mr. Baxter, who could point with pride to the 3,522 and 1,398 operating days without a lost-time accident in the Springfield and Galloway operations at the time he spoke, these records are due to the absolute loyalty of top management to operating personnel, and the ability of local plant management to utilize this co-operation to its fullest extent.

While safety meetings are held monthly, these are not scheduled around purely technical discussions. More reliance is placed on the practical psychology of having supervisory personnel provide leadership and guidance.

In the program described by Mr. Russell, a variety of materials are involved, including monthly safety posters, luminescent safety signs, safety pamphlets covering various operating departments, etc. These are keyed each month to a specific safety theme. It is also felt that employees should be steered toward good safety practices without emphasis on contests.

Action taken by the company with regard to the physical plant has involved installing guard rails and grating; enclosing ladderways; placing power lines underground; good lighting and good housekeeping; and taking other basic steps toward safe plant conditions.

Evidence of the effectiveness of the firm's program is found in the fact that the quarry has operated from and including 1956 to date without a lost-time accident.

(*Continued on page* 111)

DELIVERY OF QUARRY-RUN STONE to the primary crushing installation in the Warner quarry draws the operators' attention.

Industrial relations, fiscal policies, legislation, engineering matters, convention plans considered by

N.S.G.A. Directors at Lake Placid Meeting

By WALTER E. TRAUFFER

IMPORTANT problems of the sand and gravel industry and association affairs were discussed at the meeting of the National Sand and Gravel Association's board of directors, held September 28 to 30, 1959, at the Lake Placid Club, Lake Placid, N. Y. The board of the National Ready Mixed Concrete Association met at the same time.

The N.S.G.A. board met on Monday, September 28, the N.R.M.C.A. board on Tuesday, September 29, and a joint meeting was held on Wednesday, September 30. On Sunday, September 27, there was a joint meeting of the executive committees of the two associations. Preceding these meetings many members of both boards visited the associations' expanded research facilities at the University of Maryland.

The choice of location for the meetings was a popular one as the Lake Placid-Saranac Lake area is one of the most scenic in this country. A wide variety of both day and night entertainment was available, including boat trips and drives, a chair lift up Whiteface Mountain, excellent golf courses, etc. The old but comfortable Lake Placid Club provided adequate facilities for the meetings.

In addition to the business reports made by officers of the associations, committee chairmen, and staff members, many other important matters affecting the association and the industry were discussed, and many important decisions were made. Among these subjects were the following: public, industrial, and labor relations; zoning; stream pollution; percentage depletion; operating cost ratios; mineral industries survey; car supply; the N.S.G.A. production and value report; retirement and insurance plans; mobile radio; the steel strike, legislative developments; fiscal policies; new association headquarters; engineering problems; legislation; convention plans; and future meetings and conventions.

E. Phil Gemmer, president of the National Sand and Gravel Association.

The N.S.G.A. board meeting was genially and ably presided over by President E. Phil Gemmer (Texas Construction Material Co.), who briefly reviewed the important developments in the industry and the association since the January, 1959, meeting at Miami Beach, Fla. General business conditions throughout the country and future prospects were reported to be good.

Vincent P. Ahearn, executive secretary of N.S.G.A., gave the financial report for the first six months of 1959, which showed the association to be in excellent financial condition. Fred P. Curtis (Lyman-Richey Sand & Gravel Corp.), secretary-treasurer, gave the audit report for 1958, which was approved.

Conventions And Exhibits In Chicago The coming joint conventions and machinery exhibitions in Chicago February 15 to 19, 1960, will set new records, according to Kenneth C. Tobin Jr., associate executive secretary of both associations. Attendance is expected to exceed the record of 1958, which drew more than 7,500. All meetings will be held in the Conrad Hilton Hotel, and the exhibits will be divided between the hotel and the Coliseum.

The show, according to Mr. Tobin, will be a sellout and will be the biggest exhibit in N.S.G.A. history as well as the most attractive. There are more and bigger exhibits, and considerably more floor space is available. All producers, whether members or not, are invited to attend both the meetings and the exhibits at both locations. Ample time will be

left open in the program for attendance at the exhibits; and free bus service will be provided between the hotel and the Coliseum.

The convention program arrangements, according to Mr. Ahearn, although not yet complete, are progressing satisfactorily. There will be an important speaker for the joint luncheon, and the papers and discussions will cover a wide variety of subjects of vital importance to the industry. As usual, most of the speakers will be from within the industry.

On Saturday, February 13, there will be committee meetings; and on Sunday a meeting of the Manufacturers' Division will be held. Monday and Tuesday, February 15 and 16, will be left open for attendance at the exhibits. On Monday there will be more committee meetings, and on Tuesday the two boards of directors will meet. Convention sessions will begin on Wednesday, February 17, and will continue through Friday morning, February 19.

Coming Meetings Coming meetings and conventions were discussed, beginning with the next meetings of the executive committees, to be held in Washington, D. C., December 10 and 11, 1959, at the new association offices. As stated above, the 1960 joint conventions and machinery exhibits will be at the Conrad Hilton Hotel and the Coliseum in Chicago from February 15 to 19.

The 1961 convention will be at the Americana Hotel and the Bal Harbour Group, Miami Beach, Fla. The original dates were from January 16 to 19 but the boards voted to approve a proposal from the National Crushed Stone Association to move the dates back a week to January 23 to 26.

The 1962 joint conventions are scheduled for Chicago with exhibits, and business meetings if possible, at the New Chicago Exposition Center, which is now under construction. The 1963 conventions are scheduled for San Francisco, February 18 to 21. The boards also approved holding the combined 1964 biennial show at the new Exposition Center in Chicago. New York City was chosen as the location for the 1965 joint conventions.

The 1960 semi-annual meetings of the boards of directors will be held October 3 to 5 at the Del Monte Lodge, Pebble Beach, Calif. In 1961 the boards will meet at The Greenbrier, White Sulphur Springs, W. Va., August 14 to 16. No decision was made on the location for the 1962 board meetings, but proposals included Colorado Springs, Phoenix, Palm Springs, Victoria, B. C., and Hawaii. It was decided to hold the 1963 meetings at the Grove Park Inn, Asheville, N. C.

Vincent P. Ahearn, N.S.G.A. executive secretary, presented the financial report for the first six months of the current year.

Manufacturers' Division The report of the Manufacturers' Division of N. S.-G.A. was given by its chairman, Emil Deister Jr. (Deister Machine Co.) who is also one of three representatives of the Division on the N.S.G.A. board. He reported that all affairs of the division are in good order, and that the membership has increased. Mr. Deister emphasized the size and caliber of the coming machinery expositions and invited all producers to attend them. He also expressed the appreciation of the manufacturers to the association for leaving ample open time for attendance at the exhibits.

Group Insurance A progress report on the joint Group Insurance Plan was given by William Moore (J. P. O'Connell Co.). Membership in the plan has increased 11 percent in the last year to a total of 89 participating companies with 2,300 insured employees and insurance totaling $6,500,000 in effect. Most of these employees also have dependent coverage. A sharp increase in participation may result from a proposal of 30 companies in a western state to join the

E. K. Davison, vice-president of N.S.G.A., reported on public relations.

Fred P. Curtis, N.S.G.A. secretary-treasurer, gave the audit report for 1958.

Stanton Walker, N.S.G.A. director of engineering, reported on the research fellowship foundation, the next short course, and new publications on research.

plan *en masse*. Further expansion is expected through the committee's extension of the plan to include executives and through its approval of a request from the National Concrete Masonry Association to be permitted to participate in the Group Insurance Plan. According to Mr. Moore, this plan in spite of its relatively low cost, paid back 17 percent in dividends in 1917 to participating companies and 10 percent in 1958, and about 20 percent dividend is expected for 1959. The boards also voted to add long-term disabilty income coverage to the plan.

Retirement Plan A progress report on the Retirement Plan for officers and employees of member companies of N.S.G.A.-N.R.M.C.A. was given by Donald Shepherd, plan consultant. He said that a very satisfactory plan has been developed which can be adjusted to meet the various needs of different companies and at a comparatively low cost. At least 200 companies have expressed an interest in the plan, and it is expected that by January 1 more than 30 plans will be in effect for a total of almost $6 million. The two boards voted to approve the request of the National Concrete Masonry Assn. for its members to participate in this plan. Participation by members of the Empire State Sand and Gravel Association in both plans had been approved previously. It was also decided to elect one committee to cover all benefit plans, including group insurance and retirement.

Engineering Matters In his report to the boards, Stanton Walker, director of engineering of N.S.G.A. and N.R.M.C.A., said that the joint research fellowship foundation is under way. The next short course is full up, but it is hoped that in the future all applicants can be accommodated. Mr. Walker also gave a resume of the available publications on research of both associations, and of aggregate specification changes in progress.

A review of current laboratory researches in progress and those scheduled was given by Delmar J. Bloem, associate director of engineering of N.S.G.A.-N.R.M.C.A. Investigations are under way on the following: the effect of maximum size of aggregate on concrete strength; variations in strength-producing properties of cement; evaluation of the centrifuge test for cement content; effects of air-entraining cements on strength and durability of concrete; and effect of extended storage on strength of cement. Investigations are planned on the significance of laboratory freezing and thawing tests, water-reducing and retarding admixtures, flexural strength, etc.

Kenneth Tobin Jr., associate executive secretary of N.S.G.A., predicted bigger and better conventions and exhibits for 1960.

Delmar L. Bloem, associate director of engineering, N.S.G.A., reported on laboratory research projects under way.

Public Relations The report of the Committee on Public Relations was given by its chairman, E. K. Davison (J. K. Davison & Bro.). This committee has been very active, especially in getting out literature for members on rehabilitation projects for sand and gravel properties. The manual has been very helpful and carries much weight with zoning commissions.

Some attention has also been given to truck nuisances and to public boating safety near dredging operations. Stream pollution, he said, continues to be a problem in several states; most states have controlling laws. It was suggested that N.S.G.A. promote uniformity in these laws.

The two boards voted in favor of the organization of a Joint Committee of Industrial Relations to replace the present joint committees on Labor Reporting Services and Labor Relations. Mr. Ahearn pointed out the importance of this merger, and of the information obtained, adding that members have been helpful in supplying data.

Taxation The report of the Committee on Taxation was given by its vice-chairman, Robert Mitchell (Consolidated Rock Prod-

ucts Co.) in place of the chairman, the late J. Rutledge Hill. Mr. Mitchell reviewed the developments during 1959 on the Treasury Department's percentage depletion bill, general hearings on tax revision, exploration expenses, code regulations, Bulletin F, etc., and some of the recent case decisions on percentage depletion. Because the Bureau of Internal Revenue's study on percentage depletion will soon be out, it was decided to postpone a decision on bringing up to date the N.S.G.A. *Blue Book on Percentage Depletion* issued originally in 1951.

Fiscal Policies At the recommendation of the Joint Committee on Fiscal Policies, headed by Henry H. Kirwin (Eastern Rock Products, Inc.), the board voted to make an annual study of operating cost ratios in the sand and gravel industry. Questionnaires are to be sent to members, and the results are to be made known to them only. The subject of operating cost ratios for the industry will also be included on the 1960 convention program.

The joint boards later agreed that the first Controllers' Conference was so successful that another should be held in November, 1960, this time in Chicago, and that these should be continued on a regular basis thereafter. All members are urged to send their fiscal officers. The boards also approved the preparation on loose-leaf binders to embrace all work done in this field.

Traffic Committee The report of Charles E. Brady (B. V. Hedrick Sand & Gravel Co.), chairman of the Traffic Committee, consisted chiefly of an exhaustive report on the results of the survey of members with respect to the cost of cleaning and repairing railroad cars assigned for sand and gravel loading.

In this survey the country was divided into eight sections, and the conditions discovered varied greatly among them. There was great variation in the attitude of carriers toward car cleaning and repair; but it is evident that gravel producers generally are going to considerable expense to make cars usable. It is hoped, said Mr. Brady, that the A.A.R. will call the results of this survey to the attention of member carriers. The survey also showed variation in car supply in the different territories.

Mobile Radio In his report for the Joint Committee on Mobile Radio, W. J. Hicklin Jr. (Capitol Concrete Co.) said that at its first meeting last February the committee decided on three projects:

1. Formulating a radio operators' manual for drivers and others.

2. Encouraging members to participate in S.I.R.S.A. in getting frequency allocations.

3. Trying to get additional frequencies from the F.C.C. to eliminate conflicting channels.

The radio manual, Mr. Hicklin said, has been outlined, and it is hoped to have copies available at the conventions in February. Kenneth Tobin reported that nearly one-half of the membership of S.I.R.S.A. is now made up of members of these two associations and the A.G.C., and that they are active in its affairs.

Other A status report on the work of the Steering Committee of the National Waterways Conference was given by E. K. Davison. He reported some progress and said that the Senate Waterway Committee is making a study of the entire subject, including tolls.

Chantilly Crushed Stone

(*Continued from page* 101)

W. S. Tyler Co. screens are used throughout. These are equipped with Tyler wire screen cloth, except where otherwise specified, and are driven through V-belts by General Electric motors. The four Allis-Chalmers gyratory crushers are all driven through V-belts by 2,300-v. General Electric motors. The primary crusher motor is 300 hp., the secondary crusher motor is 400 hp., and the two tertiary crusher motors are 200 hp. each. All the crushers have air-cooled oil coolers plus heat exchangers for further oil cooling.

Other Supervising operations are F. T. Nelson, plant manager, and Edward Purcell, plant superintendent. Dean Ettl supervises pug mill production and the laboratory.

N.L.A. Operators' Session

(*Continued from page* 107)

Presentation of safety awards, an always popular feature on the program, was accompanied also by the showing of a new industrial safety film, *Growing Pains,* through the courtesy of the Portland Cement Association.

Trophy plaques, furnished by *Rock Products,* were presented to the leaders in the A1, A2, B, and C categories by Ken Gutschick, N.L.A. staff manager of technical services. The categories in this Bureau of Mines competition represent, respectively: quarries with calcining plants working more than 100,000 man-hours, similar operations totalling less than that number of man-hours, underground mines with calcining plants, and calcining plants only.

The A1 trophy was won by the Genoa, Ohio, plant of U.S. Gypsum, and was accepted by Verne Coffman. Marblehead Lime's Toole, Utah, operation was the winner of the A2 award, which was received by Wallace Wing; and the same firm's Thornton, Ill., plant was awarded the C group trophy, accepted by John Lanham. The Ste. Genevieve, Mo., Peerless plant of Mississippi Lime was the winner in category B. (For man-hour details see p. 44.)

Certificates of Safety recognizing a year of accident-free operation were also awarded to 15 different plants. (Five of these were won by Marblehead lime operations.) In addition, the York, Pa., plant of National Gypsum was recognized with a 1,000-day certificate.

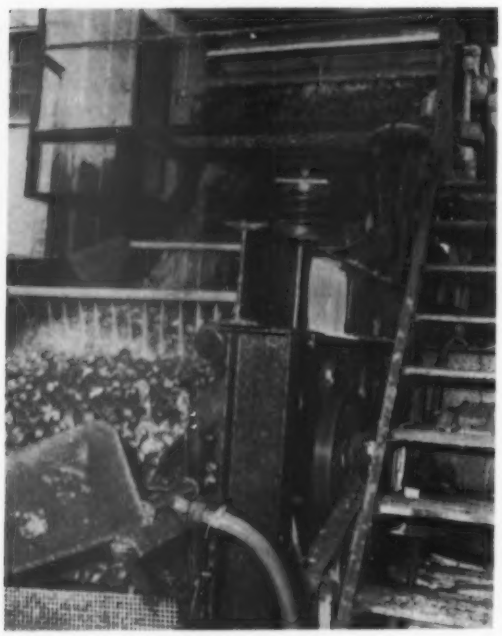
Sales for General Portland Cement Company in the nine months ended September 30, 1959, totaled $51,319,500 as against $42,966,100 in the same period a year ago. Net earnings after taxes were $9,322,700, equal to $1.76 a share, compared with $8,102,400 and $1.53 a share in the 1958 period. The statements for both years had been restated to reflect the operations of Consolidated Cement Corporation, which was merged into General Portland on April 30, 1959.

New York Sand-Gravel Solves Problems with

• two pits • gravel jig • sand cones

By WALTER E. TRAUFFER

EXHAUSTION of the most accessible deposits of sand and gravel and tightening of specifications constitute a growing problem for producers. Many have found it necessary to adjust their operations in various ways in order to retain their present markets. The management of Batavia Washed Sand & Gravel Company, Inc., of Batavia, N. Y., recently solved this problem in a very interesting manner by combining bank and dredge production and adding to its equipment a screen, a crusher, a gravel jig, sand cones, and a dewatering cone. All of this equipment went into operation early in 1959, nearly doubling the capacity of the plant and making possible a wider range of better-graded products.



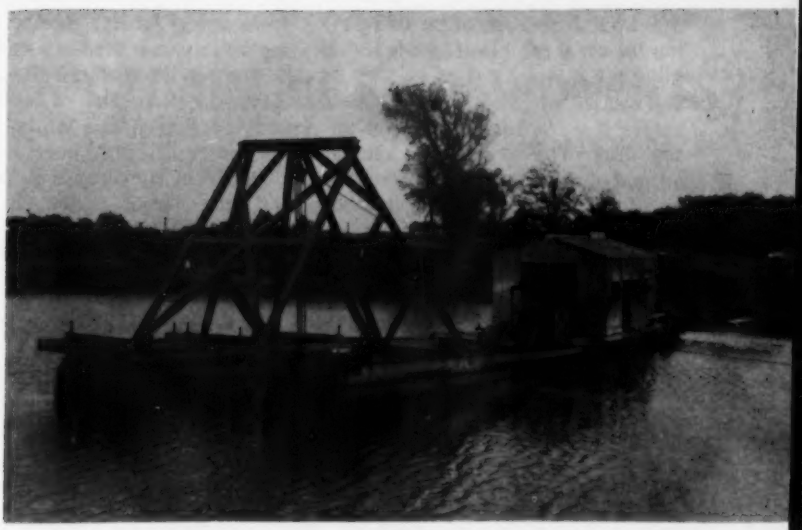
The 5- by 7-ft. diaphragm jig which removes shale and soft stone, with the vibrating screen below it.

This plant, which is inside the city limits of Batavia, was purchased by the present owners in 1954. It was then a 50-t.p.h. operation fed by a pit shovel and trucks. Soon after its acquisition the capacity of the plant was doubled, and a dragline was added for underwater excavation.

The recent expansion and improvement program was decided on for several reasons. More capacity was needed, as well as better sand gradation; so much fine sand was being lost that blending was necessary. The original pit at the plant had been dug out to 25 ft. under water level by the dragline, and the dredge was necessary to go deeper. There the material is much finer; and the new pit was opened in order to provide more coarse gravel.

The old pit, or pond, is now being dug to a depth of 55 ft. with the new dredge. The material there ranges from 75 to nearly 100 percent sand, for which there is a ready market. The Meckum suction dredge is mounted on a 19-ft. 3-in. by 40-ft. welded-steel hull, in two sections for portability. The A-frame assembly for the nozzle and cutter head is supported on two tank car tanks 10 ft. in diameter by 25 ft. long. The 65-ft. long Meckum chain cutting ladder

Producer



The new 8-in. suction dredge is deepening the pond worked out by other methods.

stirs up material for steady feed, keeps the suction nozzle clear, and brings to the surface and overcasts oversize boulders. The 8-in. Meckum Series 30 dredge pump is V-belt driven by a D353 Caterpillar diesel engine.

Maximum pumping efficiency is made possible by a pressure and vacuum gauge and recorder. When only the dredge is supplying the plant, the operator tries to hold the suction at 25 p.s.i. or a little over. When the plant is being fed from both pits, the gauge is held between 20 and 25 p.s.i. in order not to overload the sand classifying system. The pump discharge line is equipped with the usual pressure gauge.

Power for other equipment on the dredge is provided by a P & H 687C-18FS diesel generator set. This unit includes a 25-hp. motor driving the cutting ladder; a 20-hp. motor for the 3-in. pump, which provides water for priming the dredge pump and cooling the bearings; and a 15-hp. motor for the ladder hoist, which also operates the two shore lines.

Sand-and-gravel is pumped through an 8-in. line of Naylor spiral-welded pipe which is supported on welded steel plate pontoons and has flexible rubber couplings. Material is now being pumped 200 ft. with a lift of 45 ft. to a surge box lined with railroad rails to absorb wear. Under this is the new vibrating scalping screen.

The new coarse material pit, about ¾ of a mile from the plant, consists of glacial runoff averaging 25 ft. in depth above ground water level. This material averages 50 percent gravel ranging up to 5 in. in size. An Osgood 800 diesel shovel with a 1¾-cu. yd. dipper loads three 10-ton International dump trucks which haul to the plant. There they discharge to the old original hopper and Link-Belt apron feeder which formerly fed the jaw primary crusher. Now the feeder discharges on a 24-in. belt conveyor which in turn also discharges on the scalping screen below the dredge line surge box. At full capacity, this screen receives about

The sand classification system with four cones can make a wide variety of products two at a time.

100 t.p.h. from each of the two pits, but the usual combined feed is about 180 t.p.h.

This 4- by 12-ft. Seco 3-deck screen has 1¼-in. openings on the top deck. The ⅝-in. cloth on the second deck serves only to relieve the load on the 3/16-in. bottom deck. Screen oversize goes to the original No. 1036 Austin-Western jaw crusher in its new location; this unit is set at 1½-in. maximum opening. A belt conveyor carries the crushed gravel to a 3- by 6-ft. Seco 1-deck screen with 1¼-in. openings. Oversize from this screen goes to an old 48-in. Allis-Chalmers Newhouse gyratory crusher which reduces to 1¼-in. minus size. The crusher product and the screen throughs drop onto the primary belt conveyor and go back to the scalping screen.

Material off the second and third decks of the scalping screen—3/16 to 1¼ in.—drops into a 30-in. Stedman single-cage disintegrator which serves primarily as a crusher, reducing to 75 percent crushed and also breaking up any soft stone. This unit is driven at 500 r.p.m. by a 50-hp. motor. An 18-in. belt conveyor discharges this material on a surge stockpile, which has a live storage capacity of 300 tons reclaimable through one opening with an 18-in. Iowa apron feeder. Another opening with a gate is used as a standy-by.

The sand and water through the 3/16-in. bottom deck of the scalping screen is flumed to a Meckum static cone to be described later.

An 18-in. conveyor in the reclaiming tunnel feeds to the old 24-in. main belt conveyor to the screening tower. There the 1¼- to 3/16-in. material is discharged into a 20-ton hopper over the new Meckum 5- by 7-ft. diaphragm-type sand and gravel jig, which removes shale and soft stone by gravity separation. It has a skimmer bar or trough at the discharge end which can be adjusted for any desired efficiency up to practically 100 percent. In this installation maximum efficiency is not necessary, but capacity is desirable; and the output is 43 to 50 t.p.h. of product and 5 to 10 t.p.h. of waste. The latter is flumed to a pile and sold for driveways, etc. An 8-in. Peerless pump at the pond supplies fresh water to the jig at the rate of 1,000 g.p.m. at 135 ft. static head and 30 lb. pressure.

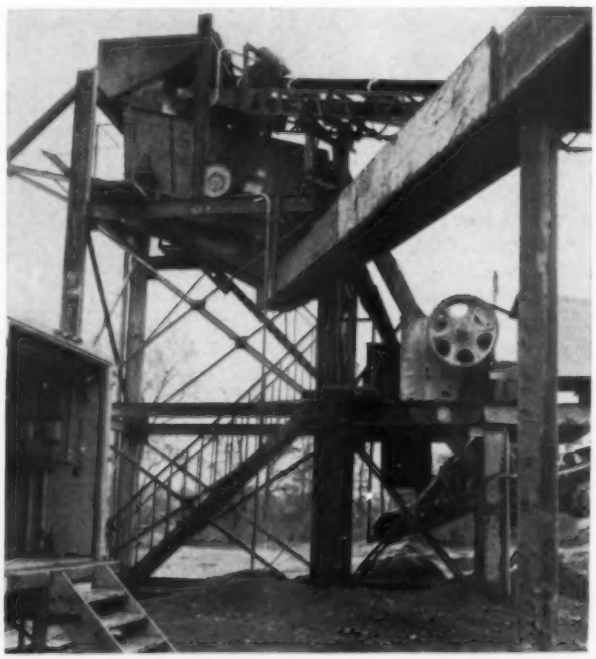
Jig product goes to a 4- by 8-ft. Seco 3-deck screen with ⅞-, ⅜-, and 3/16-in. openings and equipped with washing sprays. Part of the water overflows the jig and goes back to the pond. The three coarse sizes made by the screen drop into 45-ton truckloading bins, from which they are also hauled to stockpiles.

Minus 3/16-in. material and water through the bottom deck of this screen is flumed *via* a long 8-in. pipe to the 22-ft. diameter Meckum static cone, which also receives the sand from the scalping screen. This cone is built of steel plate. The feed usually consists of about 120 t.p.h. of material and 1,200 g.p.m. of water, about half coming from the scalper and half from the jig. The material goes first to the de-airing tank and then into the cone. A fresh water jet of 300 g.p.m. from a 3-in. pump at the pond creates the necessary turbulence and keeps all lines clear.

Material settled out by the static cone goes to a 6-in. Meckum sand pump with Ni-Hard impeller and liners and driven by a 75-hp. motor. This feeds to the Meckum Floatex system of classification which is mounted on a structural steel tower surrounded by four stockpiles.

The pump line discharges into a boiling or classifying box with 5-in. horizontal openings at one side. Water overflows at the end opposite the feed. The sand builds up and flows with water through two consecutive manifolds into two pairs of

Right: The scalping screen which receives fine material from dredge line (left) and coarse from dry pit by conveyor (right). Overs go to two crushers, sand via flume to sand classifiers.



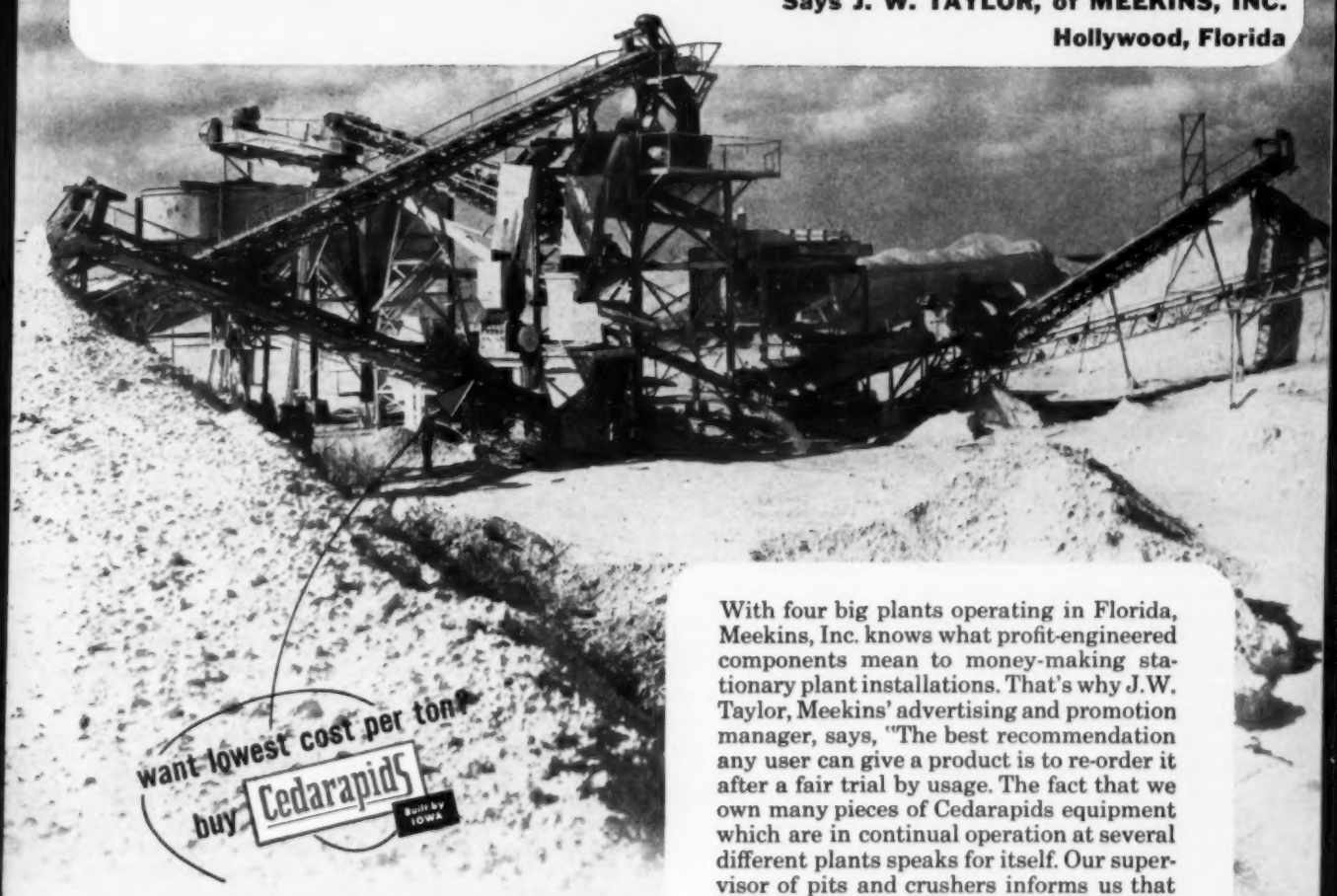
The 8-in. dredge pump with its diesel engine in right background. At left is the diesel generator set powering other motors.

Enter 115 on card, page 167 ➔

"After a fair trial by usage

WE ALWAYS RE-ORDER CEDARAPIDS COMPONENTS"

Says J. W. TAYLOR, of MEEKINS, INC.
Hollywood, Florida



Working 4 miles west of Ft. Lauderdale, Meekins' Plant #5 is producing 3/4", 3/8", 9/16" and 7/16" material at a 255 ton per hour rate, and crushing 85%. Cedarapids equipment includes a 2540 Jaw Crusher, 48" x 8' double-deck Vibrating Grizzly, a 40"x 10' Feeder, two 4033 Hammermills, and three 48"x 14' triple deck Horizontal Vibrating Screens. Plant #4 at Deerfield is working in limestone containing 30% silica and is producing 200 tons per hour of 3/8" pea rock, 9/16" material, and Mason sand, and is crushing 85%.

With four big plants operating in Florida, Meekins, Inc. knows what profit-engineered components mean to money-making stationary plant installations. That's why J.W. Taylor, Meekins' advertising and promotion manager, says, "The best recommendation any user can give a product is to re-order it after a fair trial by usage. The fact that we own many pieces of Cedarapids equipment which are in continual operation at several different plants speaks for itself. Our supervisor of pits and crushers informs us that we certainly get our money's worth with Cedarapids equipment, and our cost accounting department proves that point."

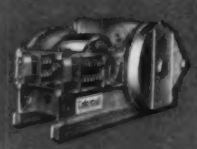
Mr. Taylor's enthusiasm for the big-capacity and low-maintenance benefits engineered into Cedarapids components is typical of stationary plant operators everywhere. Ask your Cedarapids Dealer for a fact by fact run-down on the complete line of Cedarapids equipment and the field experienced engineering assistance that "tailors" it to your requirements.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

2039N

There's a complete line of Cedarapids components for your stationary plant

20 Jaw Crusher Models


6 Roll Crusher Sizes

6 Double Impeller Impact Breaker Models

19 Models of Horizontal and Inclined Vibrating Screens

PLUS
Bins, Feeders, Conveyors, Hammermills, Vibrating Grizzlies, Spray Bars and Washing Plants

5-ft. 5-in. diameter vortex cones. This feed to the cones is so arranged that each gets consecutively finer material. Each cone discharges through a separate flume which is split to give two sand gradations or fractions for a total of 8 fractions from the four cones.

These flumes can also be swivelled to make any desired split of each pair of fractions. The flumes discharge into a dual blending box or platform which can feed to four 30-ft. long discharge flumes to stockpiles.

In the blending box the eight fractions can be combined as desired to make two products at a time, which go to piles through two discharge flumes. With this arrangement, the most popular combination is concrete sand with masons sand, and two spouts and piles are reserved for these.

Another popular combination is filter sand and special concrete finish sand, which go to the other two spouts and to piles. A third combination which is made occasionally is mortar sand and the finish sand. In each case these products as blended meet all specifications and are made without any waste. Other combinations are possible, but some of these would require wasting one or two fractions of the sand. A Northwest crawler crane with a 3- cu. yd. clamshell bucket rehandles the stockpiled materials for greater storage capacity or to make room for more than four products. Trucks are loaded from these and other stockpiles by means of a Trojan 400 Loadster front-end loader.

The 22-ft. dia. static cone which receives sand from screen in background via flume and that from sizing screen by pipe at right.

Water overflowing from the blending box and the four cones is flumed to a trough around the static cone, and the overflow from that cone is flumed to the waste section of the pond for re-use.

Batavia Washed Sand and Gravel Co., Inc., is a wholly owned subsidiary of the Genesee Stone Products Corp., of Batavia and Stafford, N. Y.

Gene A. De Witt is president of the Batavia firm; J. L. Holder is vice-president in charge of sales; B. R. De Witt is treasurer; and A. O. Fricker is secretary. A. W. Heisler is general superintendent and Homer Heisler is plant superintendent.

Sales of the Denver Fire Clay Company, of Denver in the first nine months of 1959 were $1,295,000, up 17 percent over 1958.

Left: The old screening building houses the new jig and the sizing screen.

Side view of the 5- by 7-ft. diaphragm-type sand and gravel jig.

Enter 117 on card, page 167 →

Walker Cut Stone Co., Milford, Kansas, replaced *six* smaller overworked gasoline haulers with only two 19-ton Model 65 Payhauler trucks! Their "65's" deliver 150 tons of limestone per hour, from quarry to crusher.

How new rock-ribbed 65 Payhauler® pair speeds "write-off," replacing six smaller rigs!

—for Walker Cut Stone Co., Milford, Kansas

Two new International 19-ton 65 Payhauler trucks —with the new weight-saving corrugated bodies, and the new 250-hp D-817 diesel engine—have replaced six smaller gasoline trucks for Walker Cut Stone Co., Milford, Kansas.

Results are amazing! Only two operators instead of six to pay! Only 40 gallons of low-cost diesel fuel used daily (total) by the two Payhauler rigs—against several times 40 gallons of high-priced gasoline formerly swilled by the carbureted outfits! And only two machines to maintain, instead of six! "Write-off" of the Payhauler investment speeds in "high gear!"

Payhauler features increase capacity!

Even against competitive haulers of similar rated capacity, the new 65 Payhauler gives you overwhelming advantages!

Of all off-road haulers in its size class, only the 65 Payhauler has the International-developed rock-ribbed corrugated body! This strength-multiplying principle lets the "65" shed 5,000 lbs. of power-wasting weight, and gain a full ton of payload capacity.

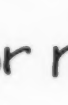
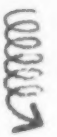
Prove the power-to-payload advantages the new rock-ribbed 65 Payhauler delivers! Compare the "65's" cycle-speeding combination of air-assist shifting; 11-second dumping, fast reversing; super-power braking; bonus-leverage, vibration-free power steering! And for 27-ton capacity, note how the 375-hp "95" leads the field. See your International Construction Equipment Distributor for a demonstration!

In only 11 seconds you dump the "65's" 19-ton load —with 3-stage, double-acting, constant-power hoist! Positive up-and-down snubbing guards against impact!

International® Construction Equipment

International Harvester Co., 180 North Michigan Avenue

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

If it rolls on an axle or turns in a bearing  or rides on a shaft
if it slides in a groove or moves on a pivot if it bores  or cuts or transmits pressure
one of Sinclair's 500
specialized lubricants is
designed to make it work better.
For answers to your lubrication
problems, write today to

SINCLAIR REFINING COMPANY

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600 Fifth Ave, N.Y. 20 N.Y.

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Industry Personalities

C. B. BURNETT, executive vice-president of Johns-Manville Corporation, has been elected president and chief operating officer of the firm, assuming the office held by A. R. FISHER since 1951. Mr. Fisher will continue as chairman and chief executive officer.

Three key sales appointments in Kaiser Gypsum Company, Oakland, Calif., have been announced. J. J. HAGUE, formerly southern division sales manager, has been promoted to the position of manager of sales, with the responsibility of supervising all of the company's sales divisions.

COLIN C. CAMPBELL is now manager of the newly-formed merchandising department. Under Mr. Campbell, this department will integrate the functions of sales service, sales promotion, and sales engineering. Formerly he was general sales manager.

JOSEPH M. ANGELIO, who has been central division sales manager, has been named assistant manager of sales for the company. All three men will headquarter in the company's Oakland home office.

D. E. Muir

DONALD E. MUIR was recently elected vice-president of Acme Materials Company, Incorporated, rock and sand producers of Phoenix, Ariz. He will continue as general manager for the firm, a capacity in which he has been serving since August, 1959. Mr.Muir previously was associated with the Phoenix Cement Company and the Riverside Cement Company.

Election of CARL B. JANSEN as chairman of the board and chief executive officer and WILLIAM E. CLARK as president and chief operating officer of Dravo Corporation was announced recently. Mr. Jansen, who has been president since 1946, succeeds WILLIAM K. FITCH, who retired December 1 after 46 years of service with the company. Mr. Clark has been executive vice- president since 1955. He had served as general manager of the Keystone Division.

THEODORE M. HOUSEKNECHT has been appointed research chemist and PHILIP BRUTTO has been named plant chemist at the Alpha Portland Cement Company facilities at Lime Kiln, Md. Mr. Houseknecht had been plant chemist there since 1957. Mr. Brutto had been plant chemist at the firm's Manheim, W. Va., installation since 1952.

ROBERT E. MEAD, assistant superintendent of the Haverstraw Quarry of the New York Trap Rock Corporation, has been promoted to the position of seismologist and acoustician. JOHN J. HARKINS, supervisor of the firm's Tomkins Cove Quarry has been promoted, and is now assistant superintendent of that installation. JOHN C. FOSTER, assistant superintendent of the Tomkins Cove Quarry, has been transferred to a similar post at the Haverstraw Quarry.

WARREN H. JOHNSON has been appointed to the San Francisco staff of the Portland Cement Association as a paving and general field engineer. Mr. Johnson, a civil engineer, was transferred to the West Coast from the P.C.A. general office in Chicago, where he has been in the Soil-Cement Bureau for the last 3½ years. In his new capacity, he will be a paving and general field engineer in the San Francisco area.

OTTO P. KROEGER, superintendent of the El Paso, Tex., plant of Southwestern Portland Cement Company, has been promoted to superintendent of the Southwestern Division. He joined the company in 1929 as a laboratory assistant.

Moving into Mr. Kroeger's former position as plant superintendent is FORREST L. HOUSE, assistant superintendent, who joined the firm in 1926 and moved up the line through various positions in the plant.

F. P. Curtis

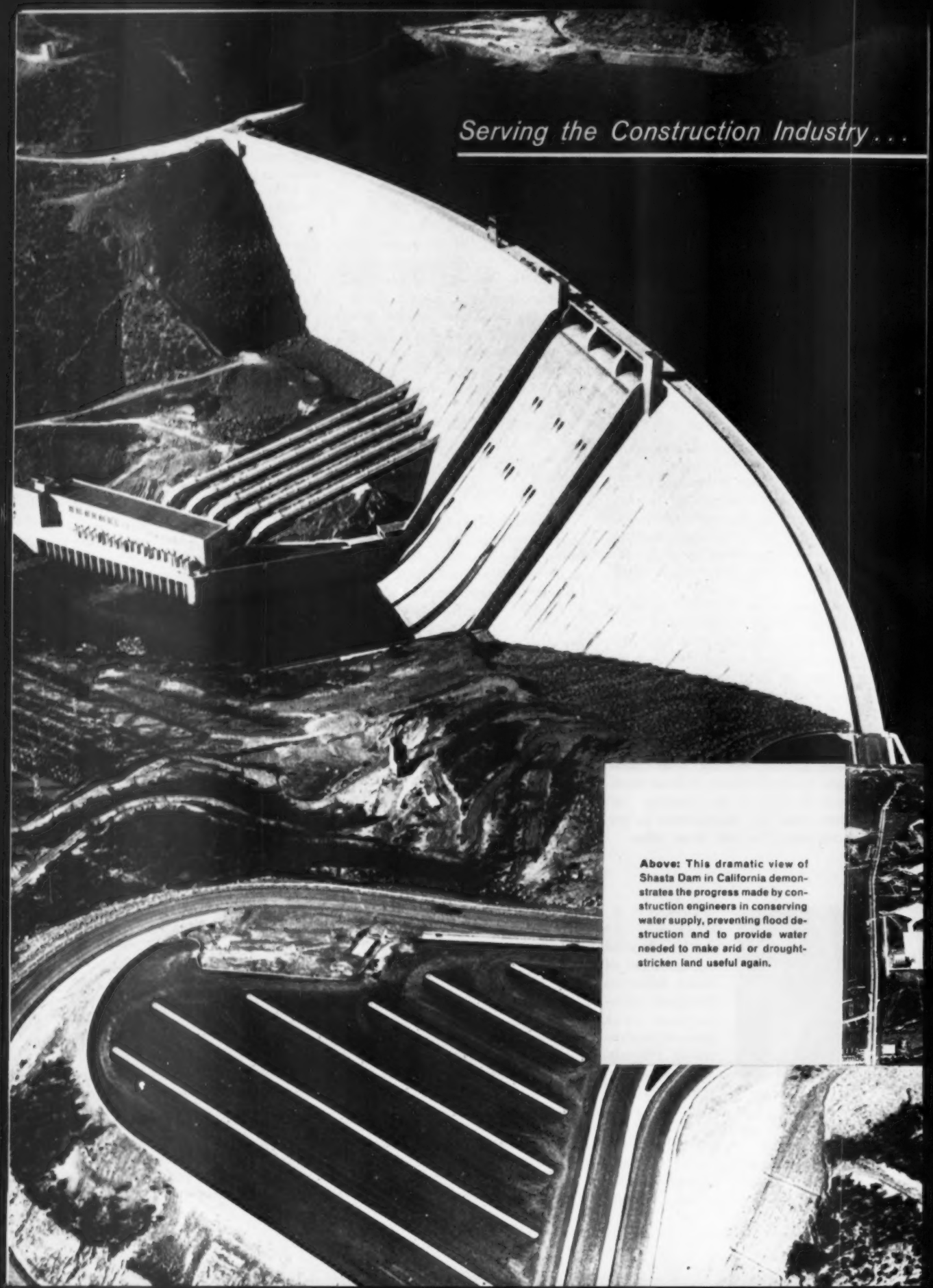
FRED P. CURTIS, president of Lyman - Richey Sand & Gravel Corporation, Omaha, Nebr., since 1935, has been elected to the board of directors of the United States National Bank of Omaha.

In addition to his many interests in local business and civic affairs, Mr. Curtis serves as secretary-treasurer of the National Sand and Gravel Association, and is a member of the Natural Resources Committee of the United States Chamber of Commerce.

Inland Cement Company, Limited, Edmonton, Alberta, has announced executive appointments in its Edmonton Division and its subsidiary, Saskatchewan Cement Company Limited, Regina, Saskatchewan:

GEORGE ROSS, formerly vice-president, Regina, is now vice-president of the Edmonton Division; ROBERT D. MACLEAN is vice-president of Saskatchewan Cement; E. J. CUYLER, formerly sales manager at Regina, has been appointed company executive sales officer at Edmonton; and R. C. MILLER, formerly of the Calgary office, replaces Mr. Cuyler as sales manager at Saskatchewan Cement.

WAYNE A. GREGORY has been named manager of operations for the Buffalo Crushed Stone Corp., Buffalo, N. Y. For the last three years Mr. Gregory has been group



Serving the Construction Industry . . .

Above: This dramatic view of Shasta Dam in California demonstrates the progress made by construction engineers in conserving water supply, preventing flood destruction and to provide water needed to make arid or drought-stricken land useful again.

Enter 120 on card, page 167

SYMONS® CONE CRUSHERS

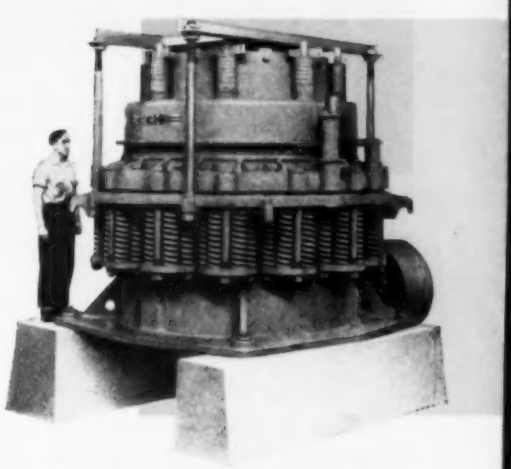
produce big tonnages of quality construction materials at low cost per ton

Illustrated here are typical examples of the vast contributions to the progress of mankind being made by the construction industry. Technological advancement in civil engineering of huge construction projects such as these call for rigid specification aggregates, crushed sand and cement. To meet the constantly growing demand for vast tonnages of these quality construction materials, Symons Cone Crushers have long been the first choice of leading producers throughout the world.

For in the production of construction materials . . . *as in all of the great ore and industrial mineral operations the world over* . . . there has been no record to equal the performance of Symons Cone Crushers that have so consistently and efficiently produced great quantities of finely crushed product at low cost.

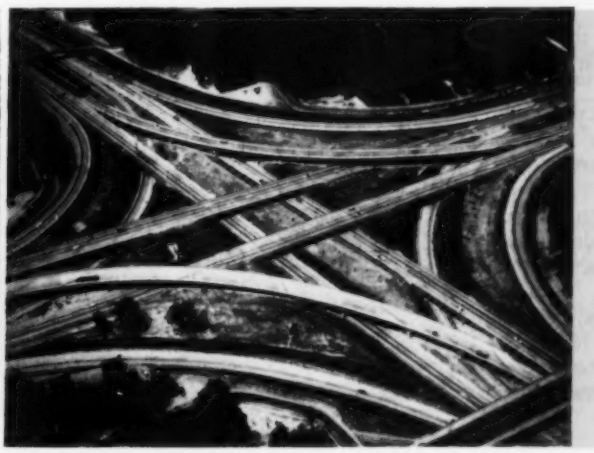
Whether you are a contractor, operator, construction engineer, designer or manufacturer, it will pay you to specify and use Symons Cone Crushers . . . as well as the other Nordberg Machinery for the construction industry . . . *all* designed and built to deliver maximum output at lowest possible cost. *Write for literature.*

SYMONS . . a registered Nordberg trademark known throughout the world



SYMONS CONE CRUSHERS

. . . the machines that revolutionized crushing practice . . . are built in Standard, Short Head, and Intermediate types, with crushing heads from 22 inches to 7 feet in diameter—in capacities from 6 to over 900 tons per hour.



Far left: To meet the challenge of the jet age, engineers and contractors are being called upon to build and expand airport runways to handle the ever-increasing traffic. (View shows Lambert Field, St. Louis).

Left: This view of one of the interchanges on the high speed Detroit expressway is a striking example of the contribution the construction industry is making to the tremendous highway expansion program.

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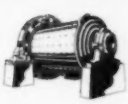
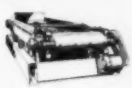
C599

SYMONS PRIMARY GYRATORY CRUSHERS



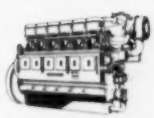
NORDBERG GRINDING MILLS



SYMONS VIBRATING SCREENS

SYMONS VIBRATING GRIZZLIES

ROTARY KILNS and COOLERS



NORDBERG ENGINES

NORDBERG MFG. CO.
Milwaukee 1, Wisconsin

NORDBERG

ATLANTA CLEVELAND DALLAS DULUTH HOUSTON KANSAS CITY MINNEAPOLIS NEW ORLEANS NEW YORK ST. LOUIS
SAN FRANCISCO TAMPA WASHINGTON TORONTO VANCOUVER JOHANNESBURG LONDON MEXICO, D. F.

superintendent at Houdaille Construction Materials Inc. in Morristown, N. J., supervising several of Houdaille's New Jersey units. (Buffalo Crushed Stone, like Construction Materials, is a subsidiary of Houdaille Industries of Buffalo.)

R. E. Barnes

RICHARD E. BARNES has been named technical director for the Perlite Institute. He will assist member companies with their technical problems, supervise the institute's research activities, represent the institute on technical committees of allied associations, and help to prepare technical literature and information on the various applications of perlite.

Several changes have been announced for the sales department of the Dragon Cement Company, a division of American-Marietta Company.

B. J. CLARKE JR. succeeds FRANK E. MORAN (retired) as metropolitan sales manager, New York City.

ROBERT A. PHELAN succeeds "DUTCH" WERMUTH as Camden, N. J., sales manager.

Mr. Wermuth assumes the duties of contract sales manager in the New York office.

PAUL CAREY has been promoted from district manager to manager for the northern New Jersey sales division.

ARTHUR W. NEWBOULD has become assistant general sales manager for all Dragon products manufactured at Northampton.

CARL H. PURRINGTON, general sales manager, will have headquarters in Boston and will be responsible for sales of the Thomaston, Maine, output.

GAINES VOIGT has been elected vice-president of the Longhorn Portland Cement Company of San Antonio, Tex., and CARLTON MASSEY has been appointed assistant to the president.

VIC DEMELLO has been named sales representative for the Modesto, Turlock, Merced, and Sonora, Calif., areas for Basalt Rock Company, Incorporated, Napa, Calif. He will replace TOM BRYANT, who has been transferred to the main office. Mr. DeMello formerly was office sales representative in the Oakland office.

The Columbia Cement Division of Columbia-Southern Chemical Corporation, Zanesville, Ohio, has appointed three new district sales representatives. E. P. O'BRIEN will assume the duties of sales representative for the newly established Cuyahoga County territory. E. EUGENE BOSEKER is now sales representative in the eastern Ohio and Northern West Virginia territory. KENNETH L. SAYRE represents the company in the central eastern Ohio territory. He replaced O. E. SPARKS, who became staff assistant to the director of sales.

ROBERT W. STEPHENS has been appointed plant superintendent of the new Midland, Mich., refractory magnesia plant of the Kaiser Chemicals & Refractories Division, Kaiser Aluminum & Chemical Corporation, scheduled to commence operations about April 1, 1960.

The following promotions have been announced for Ideal Cement Company: HARRY B. ROBERTS, formerly sales manager of the Utah Division, new special representative of the executive department; ROBERT E. AYERS, formerly assistant sales manager of the Colorado Division, now sales manager of the Utah Division; JAMES R. GWIN, formerly personnel supervisor at Ada, now terminal superintendent at Vancouver, Wash.

DONALD R. SMITH has been promoted to the position of plant manager for The Ironton Fire Brick Company. His duties will put him in charge of the plant in Ironton, Ohio, and the firm's mines at Soldier, Ky. He was formerly manager of the Special Products Division.

Three staff appointments have been announced for Phoenix Cement Company: JACK C. CLONINGER has been appointed controller; WILLIAM J. MUELLER is traffic manager; and CLYDE P. MINARD is purchasing agent. Mr. Cloninger will divide his time between the Clarkdale plant and the Phoenix office, while Mr. Mueller and Mr. Minard will be on duty in Phoenix.

J. H. GALLAGHER, who organized the Corvallis Sand and Gravel Company, Corvallis, Oreg., 48 years ago, was recently honored on the occasion of his 84th birthday. Sixty men and their families attended, and Mr. Gallagher was presented with a commemorative plaque.

Virgil Sewell

VIRGIL SEWELL was elected a vice-president of Texas Industries, Incorporated, at a recent directors' meeting. Mr. Sewell, who was previously North Texas production manager for the firm, has had 17 years of experience in the cement industry.

JOSEPH C. DUKE has been appointed to the newly created position of executive vice-president for sales administration and public relations at Minnesota Mining & Manufacturing Company. The announcement was made in anticipation of the retirement, effective the end of this year, of L. F. WEYAND, executive vice-president and director of sales, who will continue to serve as a sales consultant.

ARTHUR E. EGGERT has retired as vice-president for public relations of 3M. Mr. Eggert will also continue to serve the company in an advisory capacity.

J. D. BELL, vice-president, Alpha Portland Cement Company, and former New York district manager, will assume new duties as Eastern

SIMPLICITY

GRIZZLY FEEDER

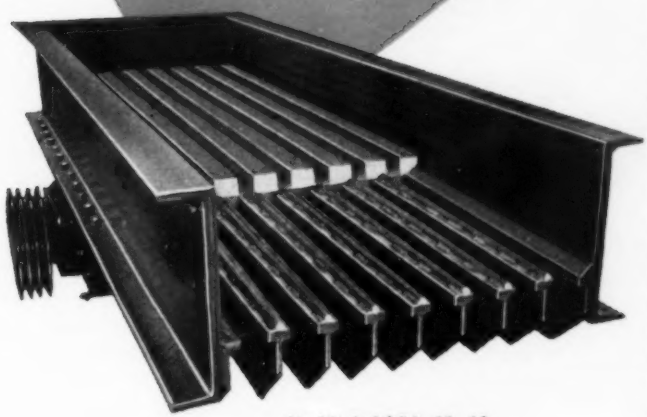
3' x 10' Model OA—10—A3

eliminates need of apron feeder and scalper . . .

Rock can't jam . . . hourly operating costs lowered

The unique design of the Simplicity Grizzly Feeder, which combines feeding and scalping in one operation, eliminates rock jams thus assuring positive uniform flow of material into the crusher.

One operator of a Simplicity Grizzly Feeder says: ". . . we have used the heaviest type of apron feeders for years and have found it necessary to shut down at least 2 or 3 times a year to hard surface the flights, inasmuch as our material is so abrasive . . . we installed a Simplicity (Grizzly) Feeder . . . with 1/4" pan and 3/16" liner . . . and are glad to report that, AFTER 9 MONTHS OF CONTINUOUS OPERATION, THE FEEDER PAN SHOWS PRACTICALLY NO WEAR WHATSOEVER, and is operating around the clock doing an excellent job of feeding at all times . . ."



3' x [illegible]' Model OA—10—A3

The Grizzly Feeder costs less than 50% of the combined apron feeder and scalper . . . weighs considerably less . . . makes a more compact plant . . . and reduces loading height by several feet. While these factors show up so prominently in portable plant production, they are just as effective in a permanent plant installation for the crushed stone, sand and gravel and mining industries.

214

Send for Catalog #571 for complete information on OS-A-VEYOR and GRIZZLY FEEDERS.

SALES REPRESENTATIVES IN ALL PARTS OF THE U. S. A.
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FOR EXPORT: Brown & Sites, 50 Church Street, New York 7, New York

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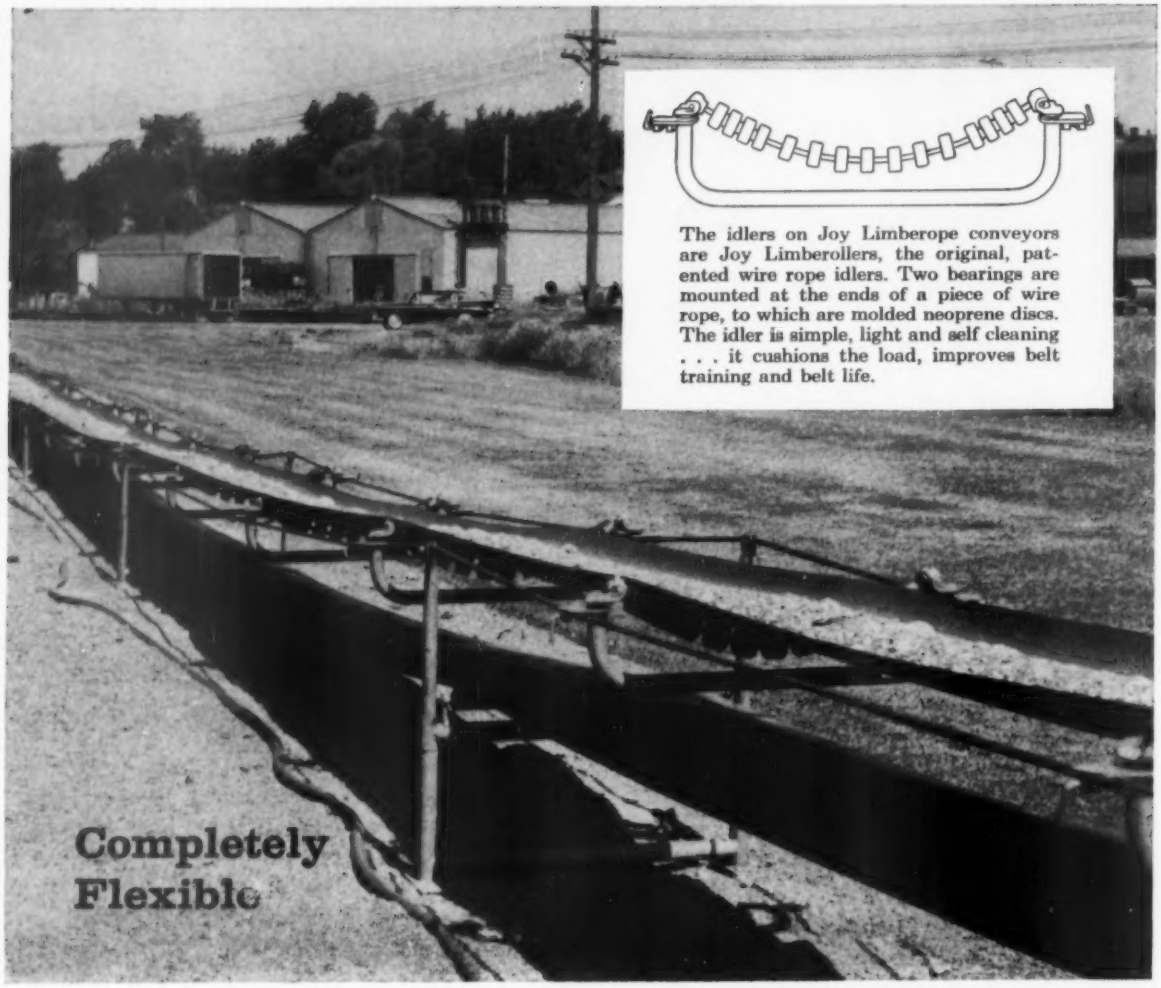
ENGINEERING COMPANY • DURAND 12, MICHIGAN



The idlers on Joy Limberope conveyors are Joy Limberollers, the original, patented wire rope idlers. Two bearings are mounted at the ends of a piece of wire rope, to which are molded neoprene discs. The idler is simple, light and self cleaning . . . it cushions the load, improves belt training and belt life.

THE JOY LIMBEROPE® CONVEYOR

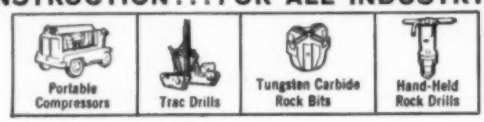
The Joy Limberope Conveyor is a truly flexible belt conveyor which can be set up quickly and stored easily. The belt is supported by idlers which are suspended from two parallel wire ropes. The ropes, in turn, are supported by rugged stands which incorporate the return idlers.

This construction makes it simple to set up the conveyor, or to tear it down and relocate. Additional sections can be added quickly, and there is no engineering involved. Limberope conveyors follow the contours of the land, and bridge gaps readily, making them ideal for cross-country transport of sand, gravel, stone, spoil, concrete and other bulk materials.

Since the conveyor consists only of stands, wire rope, idlers and belt, it can be stored in a very small area when not in use. This simple construction makes it easy and inexpensive to maintain.

For full information on how the Joy Limberope Conveyor can reduce the per-ton cost of transporting bulk materials at job sites, batch plants and quarries, request Joy Bulletin 338-26.

EQUIPMENT FOR CONSTRUCTION . . . FOR ALL INDUSTRY



JOY

Joy Manufacturing Company
Oliver Building, Pittsburgh 22, Pa.

In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

Only BAGPAKS® have a built-in insurance policy backed by International Paper

ACCIDENTS like this *will* happen. That's why International Paper plans for extraordinary stresses and strains when designing its Bagpak multiwall bags.

Only genuine *Gator Hide*® kraft, famous for toughness, is ever used in making Bagpak multiwalls. Quality is controlled every step of the way. International Paper can do this because it grows its own trees, makes its own paper, converts it into printed multiwall bags to your order. It also designs and builds *Bagpaker*® machines that can package up to 60 tons of material per hour!

When you buy Bagpak multiwall bags you get speedy shipments geared to your production schedules. *Twenty-one* sales offices and four strategically-located plants save you money by keeping your inventory at a minimum.

Only Bagpak multiwalls are backed by the full resources of International Paper—world's foremost pulp, paper and paperboard producer.

Next time your Bagpak field service engineer drops by, ask him what's new. He knows.

Bagpak Division **INTERNATIONAL PAPER** New York 17, N.Y.

Division sales manager, coordinating activities of Alpha's sales offices in Boston, New York, Easton, and Washington, D. C. His headquarters will remain in New York.

H. A. BONSTEEL was named district sales manager, New York district.

RAYMOND L. BLAINE, of the Mineral Products Division of the National Bureau of Standards, has received the silver medal for meritorious service from the U. S. Department of Commerce. Mr. Blaine was cited for "extremely competent performance of official duties," and for "fundamental contributions to the science and technology of Portland cement."

DANIEL J. MILLER JR. has been named director of product engineering at Buffalo Crushed Stone Corporation of Bowmansville, N. Y. Mr. Miller, who is also a vice-president of the firm, will direct the company's development program for prestressed and precast concrete products. He was formerly a vice-president of the North Jersey Quarry Company, now one of the Houdaille construction materials units in New Jersey.

Several appointments have been announced for The General Crushed Stone Company of Easton, Pa.:

CLIVE A. BLOWERS was promoted from district sales manager to division sales manager; he will continue to maintain his office at Horseheads, N. Y.

C. T. JOHNSON, district sales manager of the firm's Wilkes-Barre, Pa., office, was assigned additional duties as district sales manager under Mr. Blowers.

WILBUR R. SMALLWOOD was appointed assistant district sales manager of the Rochester, N. Y., office, having previously held the same position at the Watertown, N. Y., office.

Calavaras Cement Company has appointed EVAN HALL technical assistant to ORRIN WEEKS, plant manager. Mr. Hall will continue as mill superintendent, a capacity in which he has served for several years.

L. A. Zorn

G. J. Mulvey

GERALD J. MULVEY has been named manager of the Chicago distribution station of the Dundee Cement Company. He was formerly materials-handling supervisor for the aircraft engine division of Ford Motor Company.

LEWIS A. ZORN, has been named manager of the Monroe, Mich., distribution station for Dundee. He had been associated with Michigan Motor Freight Lines, Inc.

C. W. SPANGENBERGER has been appointed director of transportation for the New York Trap Rock Corporation. Since 1954 he held the post of president of the Cornell Steamboat Company, which became a subsidiary of Trap Rock early in 1958. In his new position, Mr. Spangenberger will direct all transportation activities of the corporation.

ROBERT L. MILLER has been named to fill the newly created position of assistant executive secretary of the Iowa Limestone Producers Association, Incorporated. He will assist members of the association primarily as liaison representative between producers and the ultimate consumers of crushed stone as it applies to the construction industry.

The appointment of CHARLES L. HOWLETT as manager of the Alpena (Mich.) mill of Huron Portland Cement Company has been announced.

Mr. Howlett succeeds WILLIAM G. MACDONALD, a lifetime employee of Huron Portland Cement Company, who has retired but is being retained as a consultant on community relations. Mr. MacDonald had been mill manager for five years.

S. DEAN SHOPHER has been appointed works manager of the Mexico Refractories plant at Mexico, Mo., which is now operated as a part of the Kaiser Chemicals & Refractories Division. Mexico Refractories was merged into Kaiser Aluminum & Chemical Corporation earlier this year.

ROBERT T. GRAY, formerly superintendent of industrial relations at Kaiser's aluminum plant, Ravenswood, W. Va., is now industrial relations superintendent at Mexico.

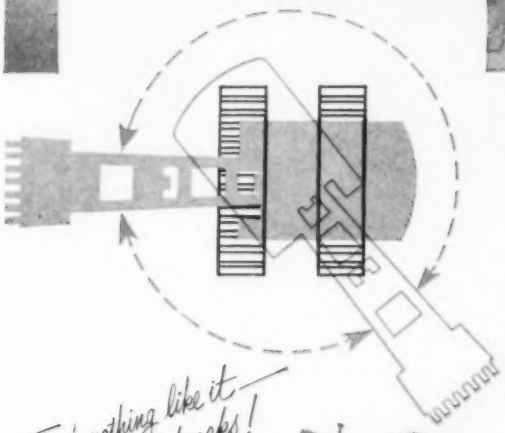
A retirement and two promotions in the operating department of Universal Atlas Cement Division of United States Steel Corporation have been announced.

RAYMOND W. SMITH, plant manager of the Northampton, Pa., plant, has retired after 38 years of service with Universal Atlas. RICHARD E. MILLER, assistant plant manager at Northampton, has been appointed to succeed Mr. Smith. He will be succeeded in his former post by ROGER MELGARY, plant industrial engineer.

CHARLES V. BUSH has accepted the position of house counsel with the legal department of the Pennsylvania Glass Sand Corporation, Lewistown, Pa.

WILLIAM L. PRICE has been appointed manager of engineering and materials for the sand- and gravel-producing Keystone Division of Dravo Corporation, Pittsburgh. Mr. Price has been manager of engineering for the division since 1951. He played a major role in the development of Keystone's new 500-t.p.h. dredge, recently placed into service in the Ohio River.

PETER S. HASS was recently elected executive vice-president of Permanente Cement Company. He joined the company in 1947 as senior engineer at the Permante plant near San Jose, Calif., and subsequently held many positions of responsibility.



DIGS.. SWINGS.. and LOADS from "STAND-STILL" position

Full-revolving . . . free-swinging . . . Koehring SKOOPER gives you big-bucket digging and loading *without* the usual drive-in back-out waste motion of tractor front-end loaders . . . *without* the high track or tire maintenance of skid-turn operation. Follow SKOOPER through a typical dig-swing-dump-return cycle . . . check its *economy of motion*:

Powerful action of twin hydraulic rams crowds the 2-yard bucket along a smooth 7-foot level clean-up from *"stand-still"* position . . . or cuts at any angle of bank slope. Next, SKOOPER swings . . . dumps load fast, clean from roll-over bucket . . . then swings back, starts next cycle . . . *all without traveling.* Or . . . at any time, SKOOPER can swing and travel simultaneously . . . work with crawlers parallel to cut, or headed into bank. You also get 3 types of interchangeable buckets (rock, re-handling, general-purpose) . . . ample dumping height . . . *plus* excavator-crane convertibility. Call your Koehring distributor *today.*

Mail to: KOEHRING Division, 3026 W. Concordia, Milwaukee 16, Wisconsin

Send us: ☐ bulletin ☐ specification sheet on revolutionary new SKOOPER

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KOEHRING DIVISION OF KOEHRING COMPANY • Milwaukee 16, Wis.

USS "T-1" Steel outlasts other steels 3 to 1 handling oyster shells, sand and gravel

at Southern Materials Corporation, Freeport, Texas

"IT TAKES a mighty tough steel to scoop cubic yard after cubic yard of oyster shell, sand and gravel day in and day out—and still not break down under rough handling and wear. In this service, USS "T-1" Steel outlasts other steels used three to one."

These are the words of a big Texan, L. M. (Buck) Clark, who started as a blacksmith and worked up to vice-president and assistant general manager of Southern Materials Corporation, Freeport, Texas. The firm provides wholesale quantities of oyster shell, sand and gravel dredged up from the Gulf bottom for fill, road construction, concrete work and the like.

All day long, the big cranes scoop up the sea material from barges and deposit it in nearby hoppers. Skilled as they are, the crane operators can't help banging the bucket against the walls and floor of the barges while picking up shell, and against the lips of the hopper at times. All that impact hastens failure in conventional materials. This leads to shutdowns and that's what they don't want.

In the past their 1½-yard clamshell buckets lasted for about six months handling sand and gravel and about twice as long scooping shell. One repair job cost $1,280 and results were no better. Then it was decided to substitute USS "T-1" Constructional Alloy Steel for the lips, end panels and side panels of the buckets. The repair job was done in the company shop and cost about $500. Mr. Clark says, "It's been two years since I put that 'T-1' Steel in there, and it's still holding up fine."

The USS "T-1" Steel used was furnished to 321 minimum Brinell hardness and does a much better stand-up-take-it job than anything else that was tried.

Besides resistance to impact and abrasive wear, "T-1" Steel solved a severe case of corrosion from salt air in both the bucket and the hopper. Corrosion build-up had to be chipped away in the old equipment causing a lot of downtime. "T-1" Steel reduced maintenance about 50%.

This is a good example of what USS "T-1" Steel can do in materials handling equipment. It has a very high minimum yield strength of 100,000 psi so can be used to save weight. It retains remarkable toughness—down to 50°F below zero. *And* it can be worked and welded.

United States Steel also makes a well-known group of high-strength low-alloy steels for construction work, having a minimum yield point of 50,000 psi. These include USS MAN-TEN Steel for strength with maximum economy, USS TRI-TEN Steel for strength with toughness, and USS COR-TEN for strength with outstanding atmospheric corrosion resistance. For more information on any of these steels, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa.

USS, "T-1," MAN-TEN, TRI-TEN and COR-TEN are registered trademarks

Bucket frequently bangs against bottom of barge causing fatigue cracks. USS "T-1" Steel's greater toughness and resistance to impact abrasion and corrision more than tripled bucket life.

Bucket and hopper parts made of USS "T-1" Steel last three times longer because of "T-1's" high resistance to impact abuse, abrasion and corrosion.

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Supply—Steel Service Centers
United States Steel Export Company

United States Steel

Enter 128 on card, page 167

Ask a hard rock driller what he likes about a

TRACDRIL

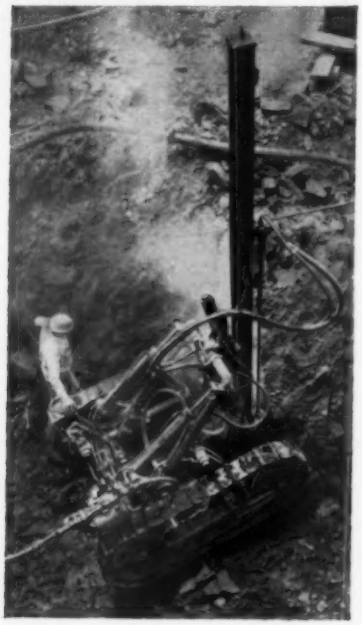
—He'll answer:

OPERATING EASE

and

SAFETY!

DRILLERS LIKE automatic brake on CP Tracdril that grabs and holds instantly when controls are released. Standing or drilling, the rig holds firm.



DRILLERS LIKE the way 6" channel constructed drill carriage provides rigid, steady mounting . . . eliminates distortion, resists crowding and prevents sag during horizontal operations. Feed always even. If steel breaks, drill will not plunge.

Here's "designed-in" safety. Release tramming motor throttle on CP Tracdril and multiple disc brake slams on instantly, automatically. No possibility of moving when rig is standing or drilling.

Dual control panels keep all hydraulic positioning levers within easy reach—drilling or tramming. U-Arm mounting lets operator convert fast from "hard high horizontals" to "snake holes". Two 6 HP "Power Vane" reversible motors give top tractive effort. Hard hitting CP-450DR Deep Hole Drill uses coupled drill steel, sinks 3-inch holes to 75 feet. Get complete information on Tracdrils from your CP equipment distributor, or write to *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

DRILLERS LIKE easy hole-spotting of CP Tracdril and the "deadman controls" insure operator safety. Drill moves ahead, backs, turns, pivots at a touch. Easily hauls 600 c.f.m. compressor up 10% grade.

Chicago Pneumatic

AIR COMPRESSORS • PNEUMATIC TOOLS • ROCK DRILLS • DIESEL ENGINES • ELECTRIC TOOLS • BLAST HOLE DRILLS • PUMPS • AIR-BLAST BITS

NOW—Low Cost—High Profit

WITH A

MECKUM-FLOATEX SAND MAKING AND CLASSIFYING SYSTEM

Here is the modern solution to low cost production of specification sands. No more constant manipulation and adjustment to meet tough specs. This marvel of sand production is producing specification sands at greater efficiency and lower costs than you ever realized possible. Once production is started, the sands are automatically classified, blended and stockpiled without labor. Meckum-Floatex Systems available to meet any requirements.

Check these features: removes clay and silt • no loss of fines • controlled uniform classification • negligible wear and maintenance • fully adjustable • maximum efficiency.

If you want the lowest cost sand production available, and the easiest operating plant, investigate how the Meckum-Floatex System can fit your operation.

MECKUM ENGINEERING, INC.

Dayton Road
Ottawa, Illinois

53 W. Jackson Blvd.
Chicago 4, Illinois

MECKUM ENGINEERING, INC.

Dayton Road
Ottawa, Illinois

Please send me the facts on how Meckum-Floatex Sand Making & Classifying System can make 'spec' sand at rock bottom cost.

I am interested in a _____TPH system.

Name _____

Company _____

Address _____

City _____ Zone _____ State _____

F-3 PQ

engine power BY CATERPILLAR

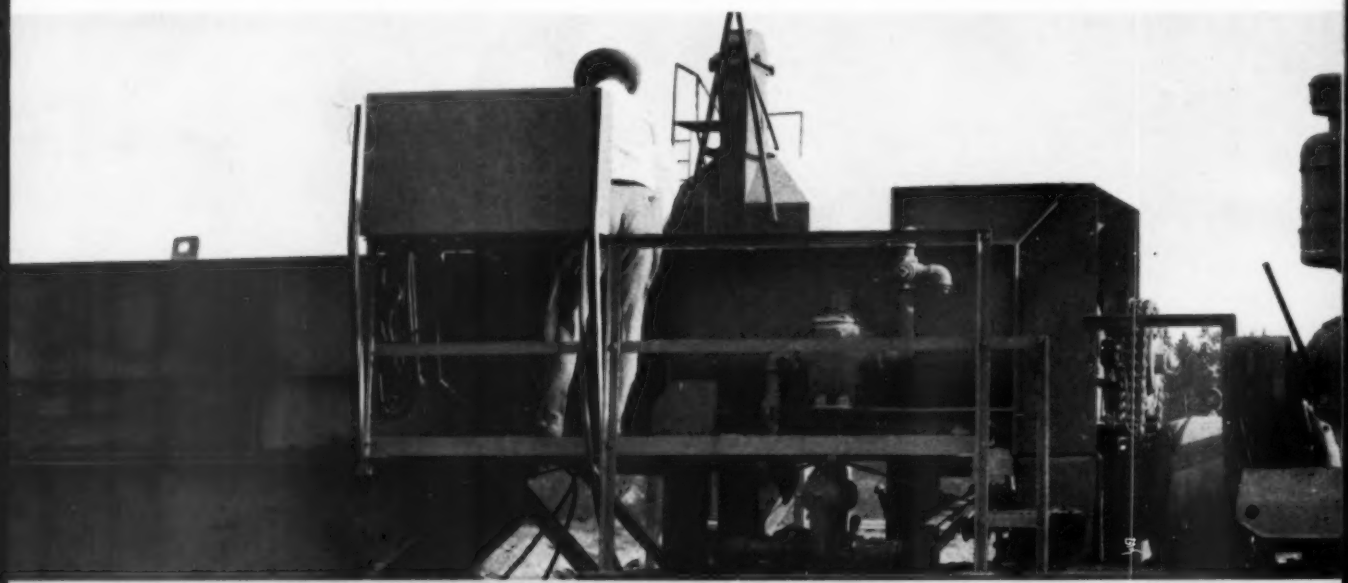
CAT "TWO-HANDED" OF BASE

. . . supplies *portable* power for *both* mechanical and electrical equipment

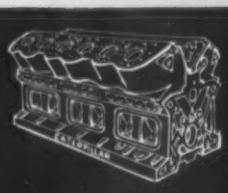
In Wyoming, where a lot of base stabilization must be done in highway construction, Wyoming Paving Company was awarded a late season paving contract where maximum plant production was a must.

Wyoming Paving Company solved their power problem—and their production problem too—with a Cat D337 Series F "Two-Handed" Engine. This Cat unit provides direct mechanical drive, through a clutch, on one end of the diesel engine shaft. Simultaneously, an electrical generator on the other end is capable of handling up to 60 KW of 240-volt, 60-cycle, 3-phase electrical load. Total rated output of the unit is 230 BHP.

With this ample power, Wyoming Paving Company has been able to double the manufacturer's minimum plant production and produce 550 tons of material an hour—occasionally as much as 600 tons. The compact Caterpillar unit has helped them speed construction of an important section of Interstate Highway 25 in Wyoming—and it gives them convenient, portable power for their



Caterpillar's own foundry casts engine blocks of a special high-tensile-strength alloy, 50% stronger than ordinary gray iron castings. Further rigidity and strength are provided by numerous ribs and partitions.



Cat Generators have outstanding heavy motor starting ability, are simple and compact with no moving parts in the voltage control system. Output terminals are conveniently located for connection to panel or load. Generators are *matched* to engines.

Your Caterpillar Dealer Engine Specialist is your diesel power consultant. He's backed by quality parts reasonably priced, and a skilled staff of factory-trained servicemen. Call him now to avoid problems later.

CDES

Enter 132 on card, page 167

ENGINE DOUBLES USUAL OUTPUT STABILIZATION PLANT

crusher and hot plant or for lighting when the unit is not needed for base stabilization.

The D337 Series F is just one of *nine* basic Cat Engines. Capacities range from 75 to 700 horsepower. This line of versatile Cat Engines saves space, gives you portable power for every purpose, and saves money where you need both mechanical and electrical power.

Your Caterpillar Dealer Engine Specialist can help you choose the best size and type for diesel power, generator or combination drive applications. He can help you with *any* problem or question you have concerning diesel power. Call him for repowering assistance or for advice in selecting the proper engine for new plants, excavators, dredges, compressors or locomotives.

CATERPILLAR

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U. S. A.

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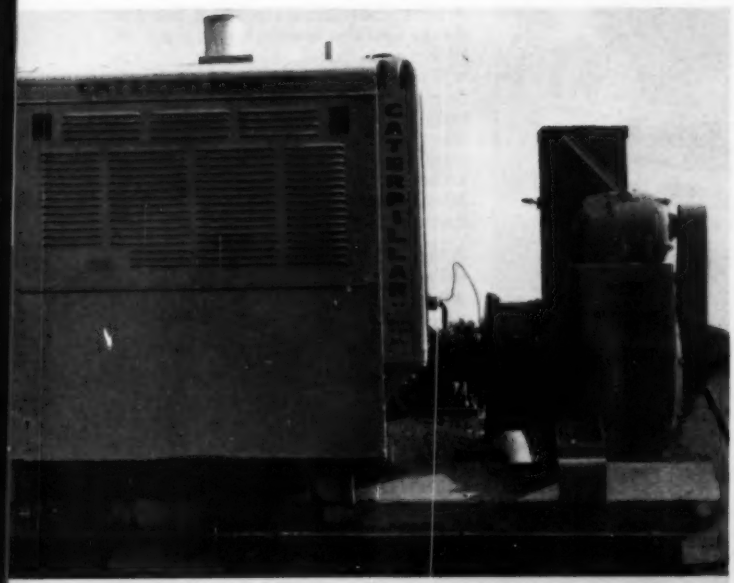
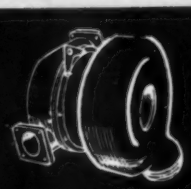
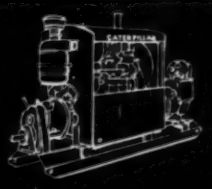
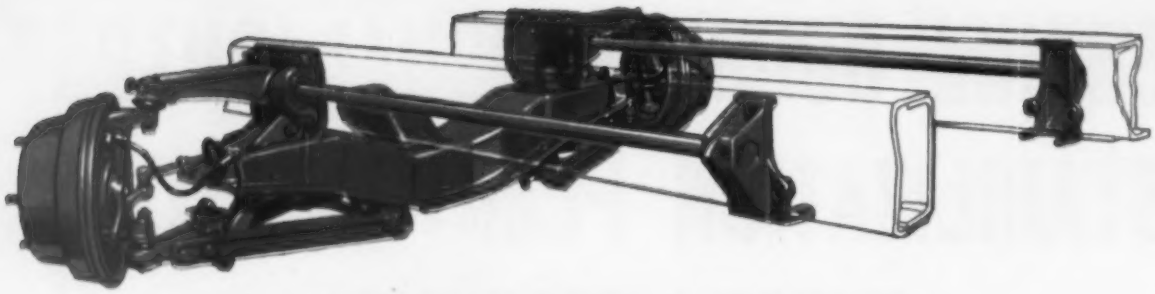


Turbocharging is standard on most Cat Engines, giving more power per engine weight to make possible a much smaller engine package for a given horsepower.



Nine basic Cat two-handed Engines range in size from the 700 HP (maximum output rating) D397 Series D to the 75 HP D311 Series H. These can be matched with generators to meet your exact job requirements.





CHEVROLET'S REVOLUTIONARY TORSION-SPRING RIDE

the most significant new truck development in decades!

Years of intensive engineering achieved a revolutionary result—a totally new truck suspension system. The most exhaustive chassis engineering program in trucking history proved conclusively that, from the standpoints of both ride and durability, the finest possible truck suspension system would consist of independently suspended front wheels with torsion bar springing. Advancing on this principle, Chevrolet engineers proceeded through years of development to produce a completely new system for the 1960 Chevrolet truck product.

New Torsion-Spring Ride—how it works. The revolutionary result of Chevy's all-out engineering effort—Torsion-Spring Ride—eliminates both the old-fashioned I-beam front axle and friction-producing front leaf springs. Each front wheel, suspended independently of the other through tough control arms and low-friction linkage, is free to step cleanly over bumps without jarring the entire truck. Also, friction-free torsion bars on either side of the chassis, specially mounted to provide a twisting action, work to absorb each jolt; they flex freely to soak up all kinds of shocks, from the smallest to the most severe.

Three new rear suspensions, tough and tailored to the truck, are completely redesigned to complement the independent front suspension in every weight class.

M70 tandem proves its stamina on year-long test of durability.

Here's a ride that lets you get more work done in a day's time! Take a '60 Chevrolet truck over a rough stretch of back road and feel the absence of I-beam shimmy and wheel fight. Chevy's torsion springs soak up jolts and jars that would shake the headlights off an ordinary I-beam rig. You move along with maximum payloads at higher safe cruising speeds. You make your tough off-the-highway runs in less time, improving your ton-mile-per-hour rate as much as 100%.

A ride that shows respect for the driver and the load! Out at the GM Proving Ground, the test drivers will take a torsion-spring Chevy any day over an I-beam truck—even if they have to drive it twice as far. The ride's that much better; that much safer. The load, too, has an easier time of it. There's far less bounce and jounce, less danger of damaging fragile cargoes.

A ride that adds extra thousands of miles to the truck's working life! You can be sure the shockproof action of Chevrolet torsion-spring ride means lower maintenance costs. As much as 78% of all objectionable road shock and vibration is absorbed before it can be transmitted to the truck's body and sheet metal. Chevy trucks stay new-looking a whole lot longer and their working life is increased by extra thousands of miles.

Once you've experienced the incredible smoothness of a torsion-spring ride, you'll realize that Chevrolet has set off a full-scale revolution with the introduction of its '60 models. By throwing away the old-fashioned I-beam in favor of independent front suspension, Chevy's new design has improved virtually all phases of truck performance. Drive a new one just once. That's all we ask. . . . Chevrolet Division of General Motors, Detroit 2, Michigan.

1960 CHEVROLET STURDI-BILT TRUCKS

CHEVROLET

Legal Decisions

On Industry Problems

By **LEO T. PARKER**
Attorney at Law
Cincinnati, Ohio

Delay In Prosecuting Suit No Excuse

A FEW weeks ago a higher court held that if both parties to a suit intentionally delay its final prosecution, neither party is entitled to a favorable judgment based upon such delay.

For instance, in *Crystal Lime & Cement Company v. Robbins,* 335 Pac. (2d) 624, a suit involved the Crystal Lime & Cement Company to quit title to certain tracts of land. The litigation dragged on for 8 years, when the lower court decided that it was proper to dismiss the suit without requiring the loser to repay to the winner of the suit the taxes paid on the land during these years.

The higher court reversed this verdict, holding that it was an abuse of discretion for the lower court, about eight years later, to grant a motion to dismiss the suit with prejudice. This court said:

"Since any party to this action could have obtained the relief to which it was entitled at any time it had wanted but both parties chose to dally for a number of years, it was an abuse of discretion for the court to grant a motion to dismiss the suit with prejudice."

Breached Hauling Contract

An official of a large sand and gravel corporation asked this legal question: "Some time ago we made a hauling contract with a man named Ellison. We agreed to pay Ellison a certain amount of money per truck load for hauling sand and gravel for five years. After he bought the trucks needed to haul this material we lost our contract, which made it impossible for us to go through with the contract we made with Ellison, who has sued our company for damages. Can he get damages, since it was impossible for us to complete our contract with him?"

In many instances parties to contracts, when interpreting their legal obligations, forget that the courts always endeavor to construe the intended meaning of the contracting parties at the time the contract was made, irrespective of various clauses contained. The fact that it becomes impossible for a contracting party to fulfill his obligations does not relieve from damages liability.

For example, in *Morris v. C. G. Company,* 283 Pac. 84, it was disclosed that a sand and gravel company entered into a contract with one Morris in which it agreed to pay him a stipulated rate over a named period for hauling sand and gravel in motor trucks.

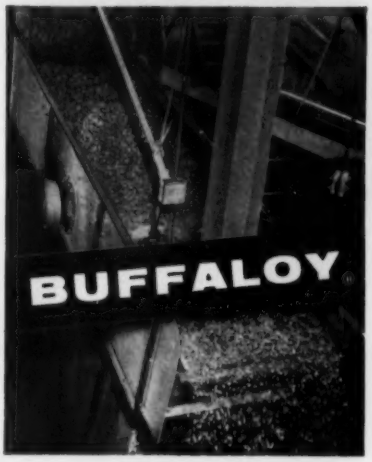
Pursuant to this contract Morris purchased new trucks and prepared to do the hauling. Before he began to haul, the company notified him that the party to whom it had intended to sell sand and gravel had cancelled the contract, and therefore, no sand or gravel would be hauled.

Morris demanded that the company pay for the trouble and expense of purchasing motor-trucks to carry out the terms of the contract. The company refused to make payment, and Morris filed suit.

In holding the company liable in damages to Morris, the court said:

"The contract is definite and certain regarding the employment, the material to be hauled, and the amount of compensation for service . . . In construing a contract, the intent of the parties must be determined from the terms of the agreement."

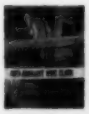
SURE WAY TO CUT
SCREENING COSTS



anti-abrasive
VIBRATOR PANELS

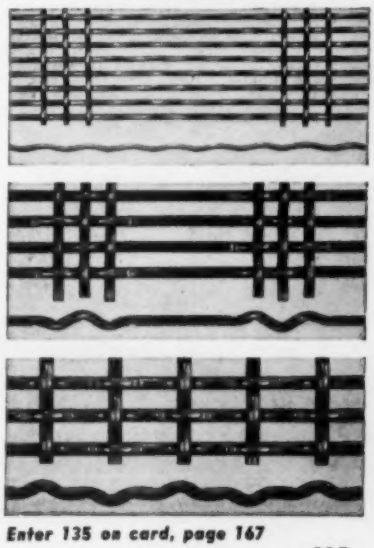
You'll be time and money ahead with Buffalo Anti-Abrasive Screens. Woven from a special formula, high carbon steel wire, here are superior panels that provide many extra hours of service. Resistance to abrasion and ability to cope with heavy shock loads are unequalled, even by higher priced panels.

Long experienced in serving the mineral aggregates industry, Buffalo Wire Works possesses the necessary skills to produce a wide selection of weaves and mesh sizes, with virtually any type of edging, for meeting your needs precisely.



You'll want the whole story in New Bulletin 600P. Write.

BUFFALO WIRE WORKS COMPANY, INC.
526 Terrace, Buffalo 2, N. Y.



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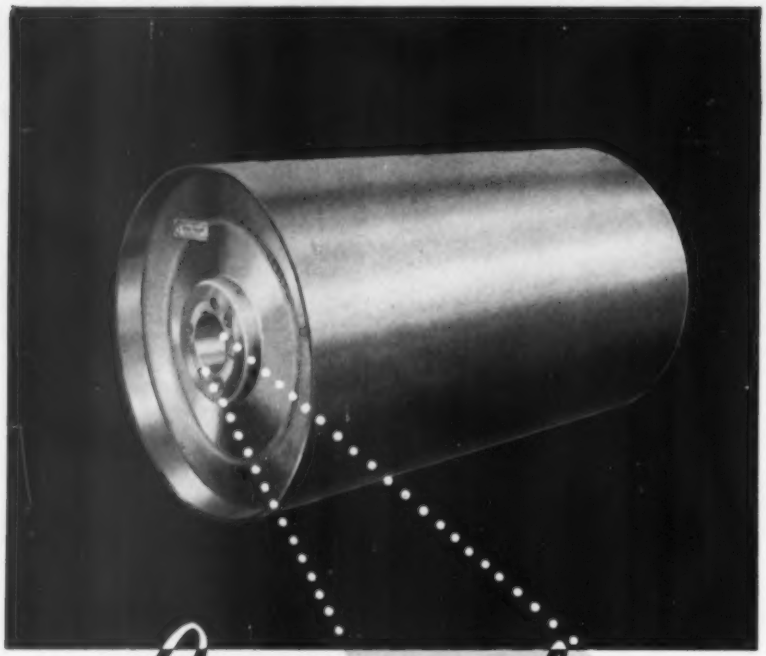

Continental

Welded Steel Pulleys with "TAPER-LOCK"® HUBS

Continental Welded Steel Pulleys are furnished with "Taper-Lock" Hubs and bushings — giving the equivalent of a shrunk-on fit while permitting easy assembly and disassembly.

Welded steel construction combines maximum strength with minimum weight, and also excludes dirt and water.

For further information on Welded Steel Pulleys, see your nearest Continental Distributor. Ask for Bulletin ID-134.

CGC

INDUSTRIAL DIVISION

Continental Gin Company

BIRMINGHAM, ALABAMA

ATLANTA · DALLAS · KNOXVILLE · MEMPHIS · MOBILE · NEW YORK 17

Enter 136 on card, page 167

Law Is Not Specific

Recently I located a higher court decision which answers a legal question submitted by a seller of cement who asked whether or not a materialman can have a mechanic's lien against a building owner to secure payment of materials furnished to a contractor who constructed the building.

The answer is no, unless a valid state law specifically authorizes issuance of such a lien.

For illustration, in *Hill Gravel Company v. Dennehy Construction Company,* 185 S. W. (2d) 503, it was disclosed that the Hill Gravel Co. furnished sand and gravel to the cement products company, which manufactured concrete blocks. The latter company's officials signed a written contract to supply a specified number of concrete blocks to the contractor, who was constructing a building. The products company failed to pay the Hill Gravel Co. the amount due on sand and gravel, and the latter filed suit to collect the amount due. Also, the Hill Gravel Co. asked the court to secure a mechanic's lien on the building being constructed by the contractor.

The higher court refused to award the Hill Gravel Co. a lien.

This higher court explained that its decision was based on a state law which did not clearly and certainly authorize mechanic's liens to materialmen who supply materials to contractors who use the materials in the construction of a building.

Within Scope of Employment

An official of a large quarry company asked this legal question: "If the owner of a motor truck is employed, under contract, to haul materials for our company and he is paid so much a ton, are we responsible and liable for payment of compensation to him if he is injured when walking across a road to wash his hands?"

The answer is yes, if his company's officials customarily directed him what to do and had control over him. The fact that he owned his own truck and was paid on a contract basis for hauling materials is not important testimony for a court when deciding whether compensation can be recovered for an injury sustained "within the scope of employment."

Present day higher courts con-

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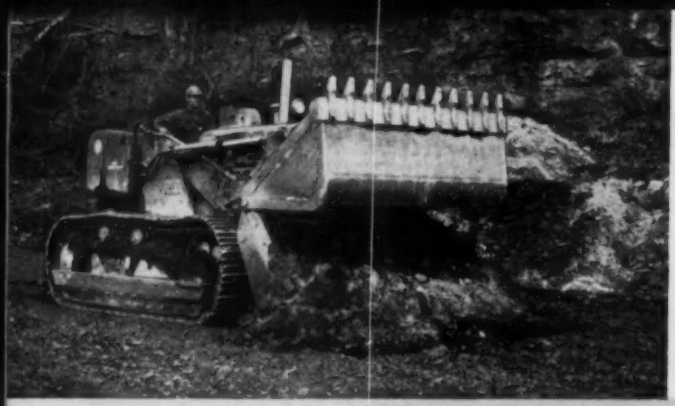


As shale is dumped on the grade, the 4-in-1 instantly changes from big-capacity loader to material-moving bulldozer. The operator simply lifts the clam lip, hydraulically, to switch machine actions. He regulates dozing depth with positive accuracy, using "radius control" of blade. It takes a bonafide, full-size standard dozer to match this capacity!

"Back-Dragging" with exclusive clamshell action, the 4-in-1 reduces time and cost of "dressing" a bank and pulling down "slide" rock. TD-20 shuttle-bar control speeds up back-and-forth cycles on jobs like this. Using clamshell in this position also permits speedy pick-up of stumps or loose materials that give straight buckets trouble.

"Our TD-20 Four-in-One does jobs impossible for regular dozer or loader"

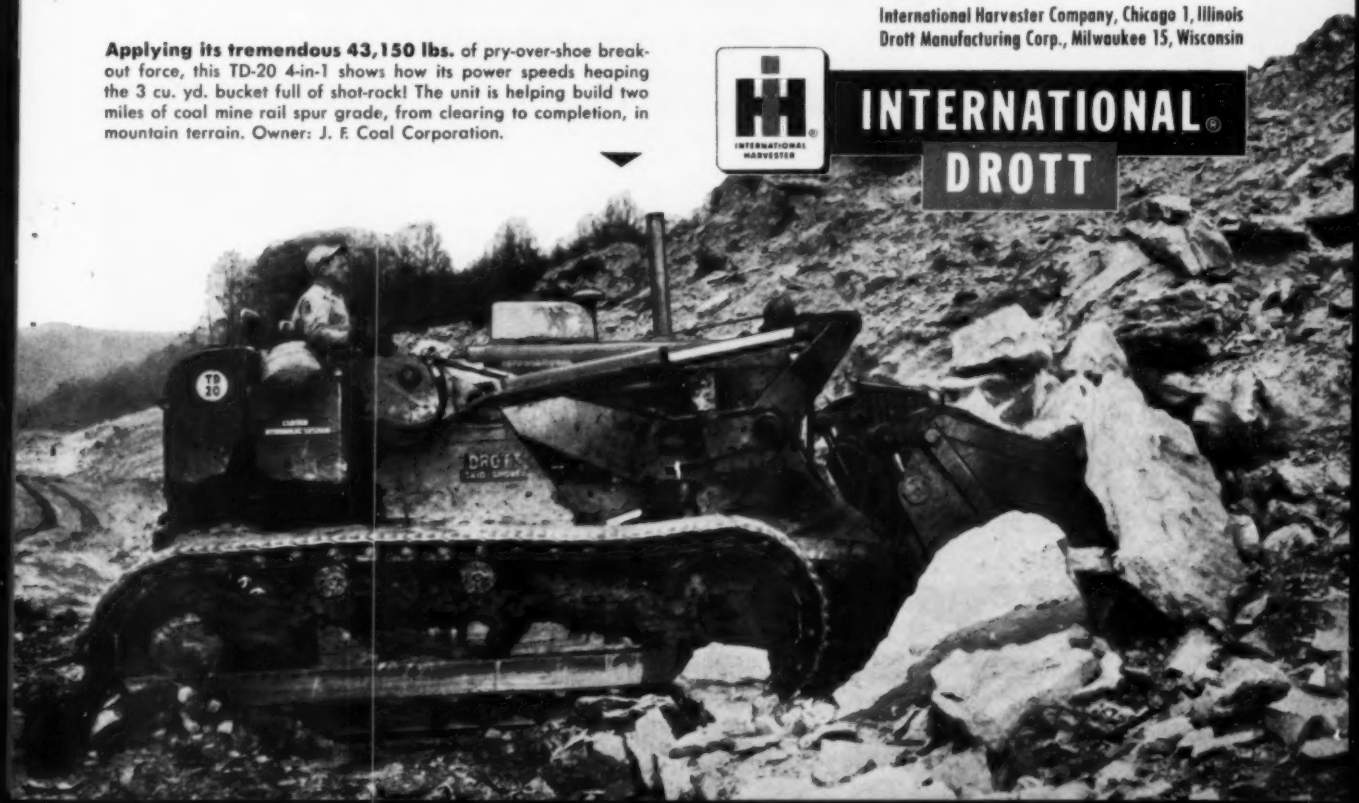
—J. F. Coal Corporation, Summersville, W. Va.

"We have used the 4-in-1 for practically all phases of this work, often doing jobs impossible with regular dozer or loader," reports Russell Patrick, Manager, J. F. Coal Corporation, Summersville, W. Va. Prove to yourself what it means to get four-machine utility—bulldozer, excavator-loader, clamshell, "carry-type scraper"—for one moderate investment. See how this "one-man equipment fleet" cuts operating cost and machinery investment—increases profit. Measure the performance-protection plus value of exclusive, shock-swallowing Hydro-Spring. See your International Drott Distributor for a 4-in-1 demonstration!

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

Applying its tremendous 43,150 lbs. of pry-over-shoe breakout force, this TD-20 4-in-1 shows how its power speeds heaping the 3 cu. yd. bucket full of shot-rock! The unit is helping build two miles of coal mine rail spur grade, from clearing to completion, in mountain terrain. Owner: J. F. Coal Corporation.

INTERNATIONAL®
DROTT

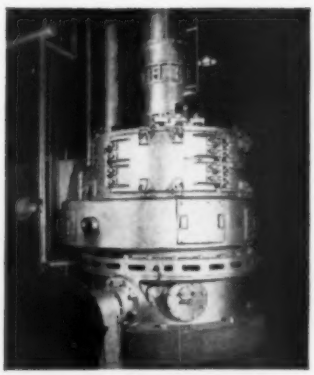


B&W Pulverizer Fires 12 x 450 Ft. Kiln Efficiently, Dependably

Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

A B&W EL Type Pulverizer enables the Cape Girardeau Plant of the Marquette Cement Manufacturing Company to direct-fire continually one of the largest kilns in the industry. They operate their pulverizer on a 24-hour day, 7-day-week basis and meet all production requirements. And — after well over two years of rugged grinding service this sturdy pulverizer has never caused an unscheduled plant shut-down.

Throughout the cement and rock products industry, performance records like that turned in at the Cape Girardeau Plant, have earned B&W Pulverizers a reputation for dependable, efficient, and economical grinding service. If you're thinking of building a new cement plant or perhaps modifying your existing facility, a B&W Pulverizer can help you cut operating costs and improve over-all plant efficiency. For the complete story, get in touch with your local B&W representative, or write The Babcock & Wilcox Company, Boiler Division, Barberton, Ohio.

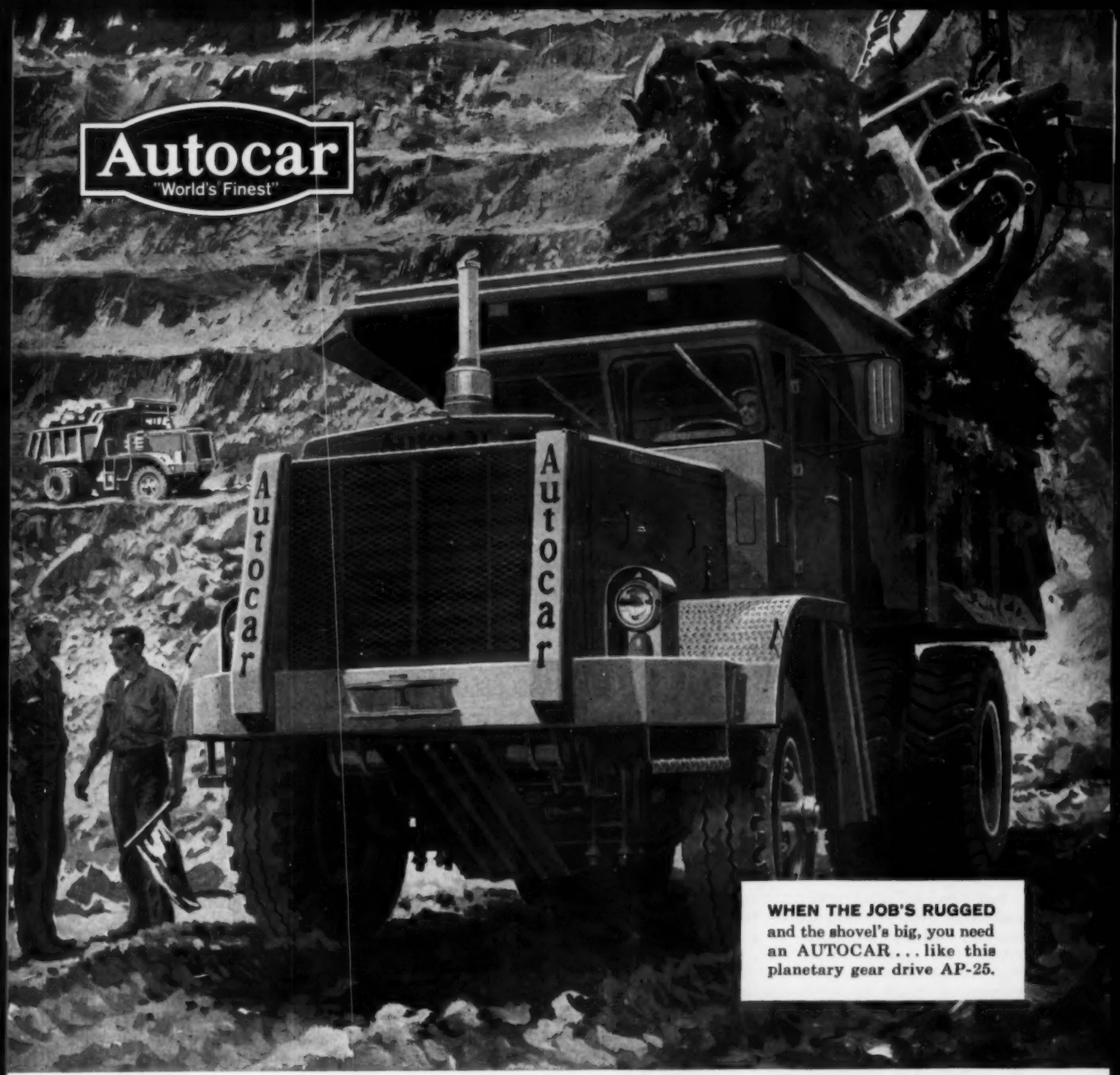


B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W THE BABCOCK & WILCOX COMPANY

BOILER DIVISION



WHEN THE JOB'S RUGGED and the shovel's big, you need an AUTOCAR . . . like this planetary gear drive AP-25.

The BIG loads call for Autocar . . . nothing less

This Autocar AP-25 is a brute. Watch it take the avalanche dropped from a big shovel—or come out of a hole hauling peak tonnage. You'll see *proof* that it's built for big payloads and fast trip cycles.

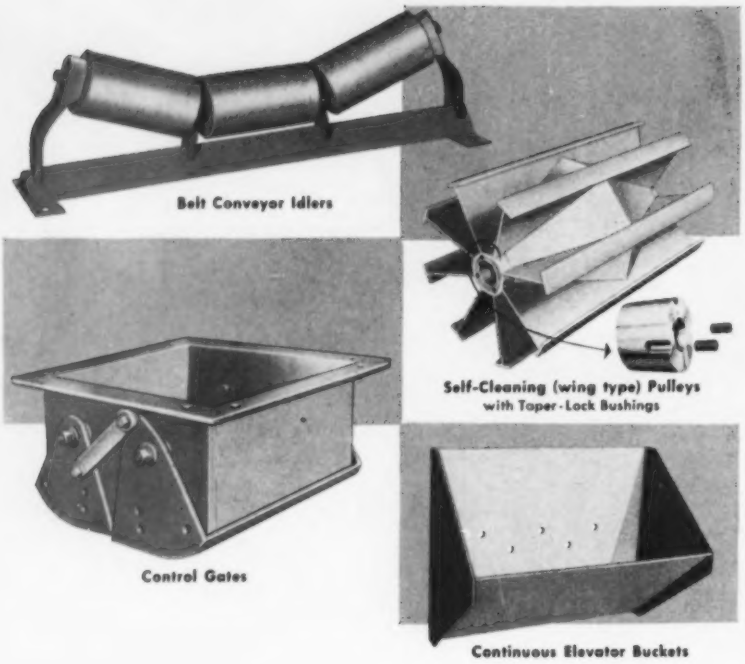
Reinforced box frame. Exceptional ground clearance. High maneuverability. Plenty of power at the wheels—thanks to planetary gear drive. *All* of these outstanding features account for the AP-25's remarkable performance. Unequaled cab design virtually eliminates profit-slashing driver fatigue.

No matter what the weather or how tough the going, Autocars work harder, longer because there's no compromise in building an Autocar . . . *every* component is selected to form a balanced unit which is custom engineered to *your* operation.

Why settle for less than Autocar . . . "World's Finest."

Autocar
"World's Finest"

Division of
The White Motor Company
Exton, Pa.



MARCO Ideas in Materials Handling Accessories

HELP INCREASE PRODUCTION AND LOWER YOUR COSTS

MARCO specializes in designing and manufacturing a complete line of modern accessories used in materials handling. The creative and sound engineering principles incorporated in MARCO equipment can help you gain greater efficiency of operation.

Belt Conveyor Idlers: MARCO equips each idler with precision ground ball bearings designed specifically to give greater load capacity, added years of idler service life and lower power requirements. Proof! At 300 revolutions per minute these anti-friction bearings will carry loads up to 860 lbs. per bearing.

Each bearing is pre-lubricated at the factory, then effectively sealed to eliminate field lubrication and reduce your maintenance costs.

Idlers fit any conveyor frame and are available in many types and sizes.

Conveyor and Elevator Pulleys: MARCO self-cleaning and solid steel pulleys offer outstanding advantages of machined faces and Taper-Lock bushings at a competitive price. Machined faces insure against pulleys being 'out-of-round', thereby increasing service-life of belt and pulleys. Taper-Lock bushings save time and trouble when mounting or demounting pulley. The MARCO line of pulleys is complete ... and delivery is prompt.

Control Gates: MARCO gates are engineered for easy installation and fast, smooth operation. Gates are operated by a positive linkage, instead of outmoded gears that wear out or become mis-aligned. Made of all steel construction and oversize wearing parts, these gates deliver maximum service under severe operating conditions. Available in 4 types and many sizes.

Continuous Elevator Buckets: Designed of two-piece construction and die-formed to insure uniformity. Continuous welds prevent leakage and give buckets added strength. Can be furnished with holes punched to standard punching diagrams or to suit your existing bolt patterns. MARCO makes the size and type elevator bucket to meet your exact requirements.

Compare and you'll see why materials handling accessories engineered by MARCO offer you more for your dollar. Get the complete facts from your MARCO distributor or contact E. F. Marsh Engineering Co., St. Louis 10, Mo.

MARCO®

engineered MARCO products:

Tubular Frame Belt Conveyors—Conveyor Idlers—Solid Steel and Self-Cleaning Steel Pulleys—Bucket Elevators—Control Gates—Feeders—Bins.

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sistently hold that an employee injured "within the scope of his employment" can receive compensation for the injury. According to a recent higher court, an employee is within the scope of his employment when doing anything for his employer's direct or indirect benefit or interest. On the other hand, the employee is outside the scope of the employment when performing an act solely for his own benefit.

For illustration, in *Stuhr v. State Industrial Accident Commission*, 208 Pac. (2d) 450, the testimony showed that a man named Stuhr owned a motor truck. He was employed by one Lane to haul gravel. His agreed compensation was 20 cents per cubic yard mile. Stuhr paid the expenses of operating and maintaining his truck. One day during working hours a piece of steel struck his right eye, producing an injury which resulted in his total and permanent blindness. The injury was sustained while he was repairing his truck. Stuhr sued Lane for compensation under the State Workmen's Compensation Act.

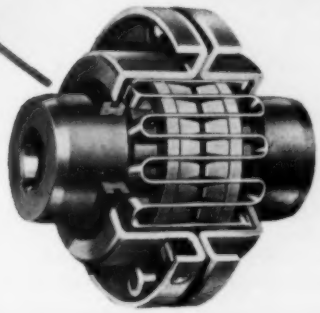
Actually the higher court held that Stuhr was a legal employee of Lane because he remained under the control and direction of Lane. Therefore, under ordinary circumstances he would have been entitled to recover compensation under the State Workmen's Compensation Act for an injury. The higher court refused to award compensation to Stuhr:

"Plaintiff (Stuhr) was employed to haul gravel, not to do the work of a mechanic. Unless such extraneous work was directed by or acquiesced in by his employer, it would seem that it should not be considered as having arisen out of or in the course of his employment. . . The accident occurred during his usual working hours, but not at a place where he was expected to be."

Also, see *McDonald v. Denison*, 185 P. (2d) 508, 510. A truck owner was hired to haul sand and gravel for a compensation of a named amount per cubic yard mile, out of which he was required to keep his truck in repair and pay for gas and oil. He was injured while repairing his truck in a repair shop 22 miles from his employer's business.

The higher court held that the injury did not "arise out of and in the

Photo shows portable pump unit connected to internal combustion engine by a Type F FALK Steelflex Coupling



How FALK STEELFLEX Couplings give your connected machinery Double Protection

FIRST: *They protect against shaft misalignment.* Some degree of shaft misalignment is unavoidable—and unless protective compensation is provided, additional loads are developed on shafts, bearings and other revolving elements. The result is excessive wear-and-tear—and often actual breakage....FALK Steelflex Couplings compensate for either angular or parallel misalignment—*or for the more serious condition involving both!* The exclusive Steelflex gridmember which joins the two hubs is not fastened to either hub; thus, either hub can shift in any direction without imposing a load on the other hub.

Yet, important as protection against shaft misalignment is to you, it is only one function of the *truly flexible* FALK Steelflex Coupling.

SECOND: *They protect against torque fluctuations* which create excess wear on connected machines and frequently induce destructive shaft misalignment. The exclusive FALK Steelflex grid-groove design cushions shock loads, dampens vibration, reduces impact loads as much as 30 per cent. You get this extra margin of protection that *can mean the difference between operating and breakdown!* You save on maintenance costs. And —you prolong the service life of your machines!...For complete information, ask your FALK Representative or Authorized Distributor. Or—**write direct for Bulletin 4100.**

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THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN

Representatives and Distributors in Most Principal Cities

Manufacturers of Quality Gear Drives and Flexible Shaft Couplings

Basic Type F FALK STEELFLEX COUPLING fills the needs of 90% of industrial applications

This cutaway view shows the exclusive Steelflex design which provides *torsional resilience with the strength of steel.* This torsional resilience spreads peak or shock loads over a relatively long increment of time, thus *greatly reducing stresses* in connected machinery.

The versatile Type F Steelflex can be used horizontally or vertically, without modification or special parts. It is ideally suited to 9 out of 10 applications. For unusual applications involving overload conditions, extended shafts, brakes, etc., standard designs of dual-purpose Steelflex couplings are available.

For most applications, you can give your machines the extra protection afforded by FALK Steelflex Couplings at no extra cost!

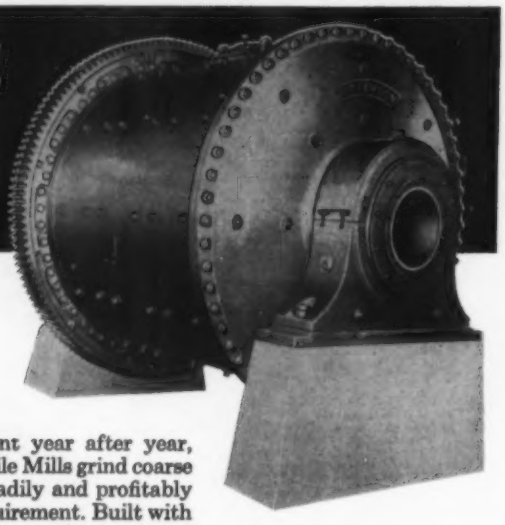
FALK

...a good name in industry

Patterson –

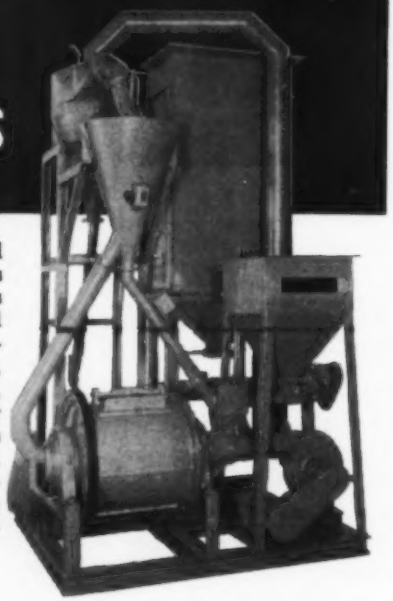
your one-word key to profitable grinding

in BALL, TUBE and ROD MILLS



Built to take punishment year after year, these heavy-duty, versatile Mills grind coarse or fine—wet or dry—steadily and profitably for every production requirement. Built with cast manganese or chrome-moly head and grate liners, these Mills are furnished with replaceable cast manganese, ni-hard or rolled steel shell sections, and can also be supplied with buhrstone, porcelain or high-density alumina linings. Let our engineers select the right mill for your grinding needs.

or COMPLETE GRINDING SYSTEMS



Patterson Systems are designed and built to fit your production demands —whether 50 lbs per hour or 50 tons per hour. Shown is our widely-used pilot plant system, with 2′ x 2′ continuous mill, pneumatic classifier, cyclone product collector, dust filter, feeder, feed bin, air supply blower and all necessary piping. The unit is mounted complete on a single base, requiring only an electrical connection. Let our laboratory grind samples of your materials—let our engineers consult with you. Write!

THE Patterson FOUNDRY AND MACHINE COMPANY

A Division of Ferro Corporation

East Liverpool, Ohio

THE Patterson FOUNDRY AND MACHINE CO. (CANADA) LTD.

Toronto, Ontario

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course of his employment," and was not compensable.

For further comparison, see *Smith v. Reich Bros.*, 203 La. 928. In that case one Smith owned a motor truck and he was employed hauling road-surface material. He was standing on the highway awaiting the arrival of his helper when he was struck by another truck and seriously injured.

In subsequent litigation the higher court held that there was a causal connection between Smith's employment and his presence at the place where he was injured, and that the injury arose out of and in the course of his employment. Smith was awarded compensation under the State Workmen's Compensation Act.

Also, see the leading case of *March v. State Industrial* 142 Or. 246; *Freedman v. Shottenfeld*, 9 N.Y.S. (2d) 88; and *McKay v. Crowell Company*, La. App., 189 So. 508. All of these courts held that an employee is within the scope of his employment and entitled to compensation for an injury received while eating his lunch upon his employer's premises, or sleeping thereon, or taking a shower bath thereon. These cases were decided in favor of the employee upon the theory that the employee, at the time of sustaining the injury, was doing something which was ultimately for his employer's interest.

Perpetuity Clause Void

A reader asked this question: "Is a contract or deed valid and enforceable which contains no time limit, and does not specify the date it runs out?"

According to a leading higher court decision, a contract or deed is void which contains a clause to the effect that a buyer will purchase merchandise at a stated price, with no time limitation.

For instance, in *Brown v. Mathis*, 41 S. E. (2d) 137, it was shown that the Kirkpatrick Sand and Cement Company was involved in a controversy involving a deed for a tract of land. The deed contained a clause that the sand and cement company "reserves to itself, its successors and assigns, the right to mine and take from said land all sand together with the necessary rights of going upon said land to secure same." The deed also specified that the company

Today...the cry is "CLEAN IT UP"

DO IT WITH SECO VIBRATING SCREENS

Shown here is a SECO TWIN BEARING screen photographed at Jackson Pike Sand and Gravel Co. . . . delivering the clean, accurately sized product their customers demand.

Today, the cry is "clean it up" and that's what good operators are doing . . . to get and hold their share of the aggregate business . . . how about you . . . is your plant ready? Don't put up with obsolete equipment that can't possibly do today's job. Don't chance losing business and profits because your product can't make the grade . . . today's specs are stiff . . . tomorrow's promise to be stiffer. You can't afford not to have the best screens in your plant . . . that means SECO SCREENS. Let us show you how to "clean it up" and make profits. There's an exactly right SECO TWIN BEARING or 4-BEARING SCREEN to handle your requirements . . . from scalping to final sizing.

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SCREEN EQUIPMENT CO., INC.

BUFFALO 25, NEW YORK

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TRUE CIRCULAR ACTION

VIBRATING SCREENS

RECOGNIZE THIS LOT?

It's the lot of a Caterpillar Dealer, one of over 300 in the U. S., offering you the best buys in used equipment!

No matter what you want in used equipment, no matter what the price range, your Caterpillar Dealer is headquarters for your best buy. No other dealer offers you "buys" with this protection:

BONDED BUY

1 **A "BONDED BUY"** up to $10,000 on used Cat-built equipment—your guaranteed assurance of satisfactory performance on *all* parts of the machine during the guarantee period.

2 **A "CERTIFIED BUY"**—his written guarantee covering units of any make.

3 **A "BUY AND TRY"** deal—his written money-back agreement on units of any make.

For the best buys in your area, to be *sure* of what you're buying, see your Caterpillar Dealer. You'll find him listed in the Yellow Pages!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

CATERPILLAR

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BEST BUYS IN NEW AND USED EQUIPMENT

Enter 144 on card, page 167

would pay 20 cents per car for all cars of sand taken from the premises. There was no provision or clause in the deed specifying the duration of this right to take materials from the land. Later a suit was filed to invalidate the clause on the grounds that it was an attempt to reserve an option with no time limit fixed for its performance, and that it violated the legal rule against perpetuities.

The higher court agreed and held the clause void, saying:

"The reservation clause was an attempt to reserve a perpetual option to purchase the sand on the land described at the price of 20 cents per car, and constituted a direct violation of the rule against perpetuities."

When Use Tax Is Void

The owner of a concrete plant asked: "If a state law invalidates a sales tax, does this mean that a use tax is uncollectable by state authorities?"

The law is well settled that states are prohibited by the Federal Constitution from regulating or taxing commerce between states. Therefore, a "sales" tax cannot be lawfully imposed on sales made in interstate commerce, that is, on merchandise shipped from one state into another state. However, to avoid this regulation the various states have enacted as a supplement to their sales tax law another law known as a "Use Tax." This law imposes a tax on goods coming into the state for use by purchasers therein and upon which the state "sales" tax has not been paid.

According to a leading higher court decision, if a state has been administering both the "sales" tax law and "use" tax law as one, a law which exempts a commodity or product from one tax automatically exempts the products from the other.

For example, in *Union Portland Cement Company v. State Tax Commission*, 176 Pac. (2d) 879, it was shown that a state adopted a law requiring payment of 2 percent tax on merchandise purchased or used. In other words, the "sales" and "use" taxes are each 2 percent of the purchase price. The Tax Commission administered the two laws as though they were one, and when the sale of certain merchandise was exempted from the "sales" tax, it considered the use of that property was also exempted from the "use" tax.

Litigation arose whether the Union Portland Cement Co. must pay a 2 percent use tax on coal which it purchased and had shipped from another state. In view of the fact that a state law exempted coal from the "sales" tax, the higher court held that the cement company need not pay a "use" tax on the coal.

This decision is unusually important because it is applicable to all products, including cement, lime, rock, sand, gravel, etc.

Liability of Seller

A reader asked this question: "Do you have a set of rules that a seller can go by if a purchaser sues for non-delivery of purchased materials?"

A review of late higher court decisions discloses valuable legal rules, as follows: A purchaser of materials or merchandise may, without any liability to the seller, rescind a contract and refuse to accept and pay for purchased materials if the testimony shows that the merchandise does not comply with the exact terms of the contract of sale; if the seller has failed to ship by the carrier specified in the contract; if the seller ships C.O.D. instead of on open account stipulated in the contract; if the object of the contract is illegal or if the seller rescinds or changes the contract; if the seller performs any other breach of the contract; or if the seller fails to make delivery at the promised time.

It is well established that a seller who breaches a contract of sale is liable in damages to the purchaser. Moreover, various courts have held that, if a seller breaches a sale contract, the purchaser (1) may upon discovery of the breach rescind the contract and sue and recover from the seller the money paid, in which case he must restore the materials he has received by virtue of the contract; (2) he may sue to cancel the contract, and in such case it is sufficient for him to offer to restore the merchandise which he has received under the contract; or (3) he may affirm the contract, retain the materials, and sue to recover the damages sustained by reason of the seller's breach.

On the other hand, it is important

Enter 145 on card, page 167 →

IS THE WORD FOR THE NO. 977 TRAXCAVATOR AT THIS WHITE CLAY MINE

"We use our No. 977 with bulldozer to level spoil land, grade roads and clean waste material from the clay. With the bucket, we remove overburden and load the clay—and it outloads our shovel."

The man talking is Assistant Mine Manager A. J. Carpenter of Inter-Chemical Corporation, Hephzibah, Ga. Summing up, he adds: "The No. 977 is a very versatile machine."

"Versatile" is a good word for the Caterpillar No. 977 Traxcavator—and "rugged" is another for a machine that can stand up to tough, all-round work like this day in, day out. Take the main frame, for example. Its integral construction provides rigid support and high load-carrying capacity. Built of heavy steel and welded to form a one-piece unit, it is mounted so that digging loads and stresses are absorbed by the track roller frames.

The No. 977 crowds a full load into its 2¼ cu. yd. bucket on every pass. And it is available with the exclusive Caterpillar Side Dump Bucket, capable of delivering remarkably high production in certain applications. And other attachments can make it the handiest hard worker on your operation.

Contact your Caterpillar Dealer and have him bring a No. 977 around. As Mr. Carpenter says: "The Cat Dealer told us what this machine would do. A demonstration showed us the No. 977 would do that and more."

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR

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NO. 977...
VERSATILE AND RUGGED

Here's all you have to do to get free drilling estimate using Schramm Rotadrill in your area. Just send rock samples along with your name and address, to Schramm, Inc., at the address below.

NOW, GET ACTUAL DRILLING COSTS FOR YOUR AREA . . .

Send rock samples and get drilling estimate–free!

Don't guess at what drilling blast holes should cost you—or what it costs your competitor. Get the facts, free—from Schramm. Just send a representative sample of rock from your area. We'll test it—then give you a comprehensive estimate of what the drilling rate with the Schramm Rotadrill would be in your area.

One thing you'll be sure of—your answer will be the fastest drilling rate possible. Why? Because Rotadrill is the newest, most modern drilling rig available, anywhere. Rotadrills penetrate faster than any other rig because hydraulic down pressure is automatically regulated and an abundant supply of air removes the chips instantly and keeps the hole clean. Quarry operators report increased penetration up to 55% in hard rock, when they use Schramm Rotatool for bottom-hole drilling.

Get the facts, promptly. Send a sample the size of your fist, today. If you would first like more information, see your local Schramm Dealer, or write for your copy of Bulletin DM 58-4.

See the Yellow Pages for local Sales and Service of Schramm Rotadrills—Truck, Pneumatractor, "Do-it-yourself."

Pneumatractor Rotadrill is a complete, self-contained 125 cfm air compressor and self-powered drill rig that drives to the job and sets up in minutes. Eliminates separate air compressor and wagon drills. "Lazy Susan" pipe rack speeds steel changes. Larger tractor- and truck-mounted rigs also available.

Schramm, Inc.

MANUFACTURERS OF AIR COMPRESSORS

640 North Garfield Ave. • West Chester, Pa.

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to know that a purchaser of non-metallic materials cannot, without valid reasons, breach a contract of sale and refuse to accept delivery of purchased materials. If the contract of sale does not clearly specify the seller's remedy and the purchaser refuses to take the materials and pay the agreed price therefor, the seller may resort to any one of these remedies, *viz:* (1) standing on the sale, the seller may retain in his possession goods for the benefit of the purchaser and sue for the full purchase price; (2) acting as the agent of the purchaser, the seller may resell the materials and then sue the purchaser to recover the difference between the contract price and the price obtained on the resale; (3) the seller may treat and keep the goods as his own, and recover by suit from the purchaser the difference between the contract price and the highest price obtainable at the time and place the materials were to be delivered.

Not Legal Nuisance

An official of a cement corporation asked: "If our corporation produces dust during the operations of our plant, can owners of nearby homes stop operation of our plant by filing a suit? Can they recover damages?"

The answer to the first question is no. This is so because all courts are in disfavor of stopping or otherwise seriously interfering with manufacturing operations or a business enterprise. Sometimes the courts will not award damages. This is particularly so if the plant was in its present location before the complaining property owners built their homes.

For illustration, in *Signal Mountain Portland Cement Company v. Brown,* 141 Fed. (2d) 471, the testimony showed that certain owners of dwellings filed suit against a cement company to recover damages as a result of what they termed a "nuisance" maintained by the company. The property owners testified that in the manufacture of cement at its plant the company produced smoke, large quantities of dust, ashes, and powdered cement which permeated the pure air.

The lower court held the company liable . The company officials appealed to the higher court and denied that its business constituted a nui-

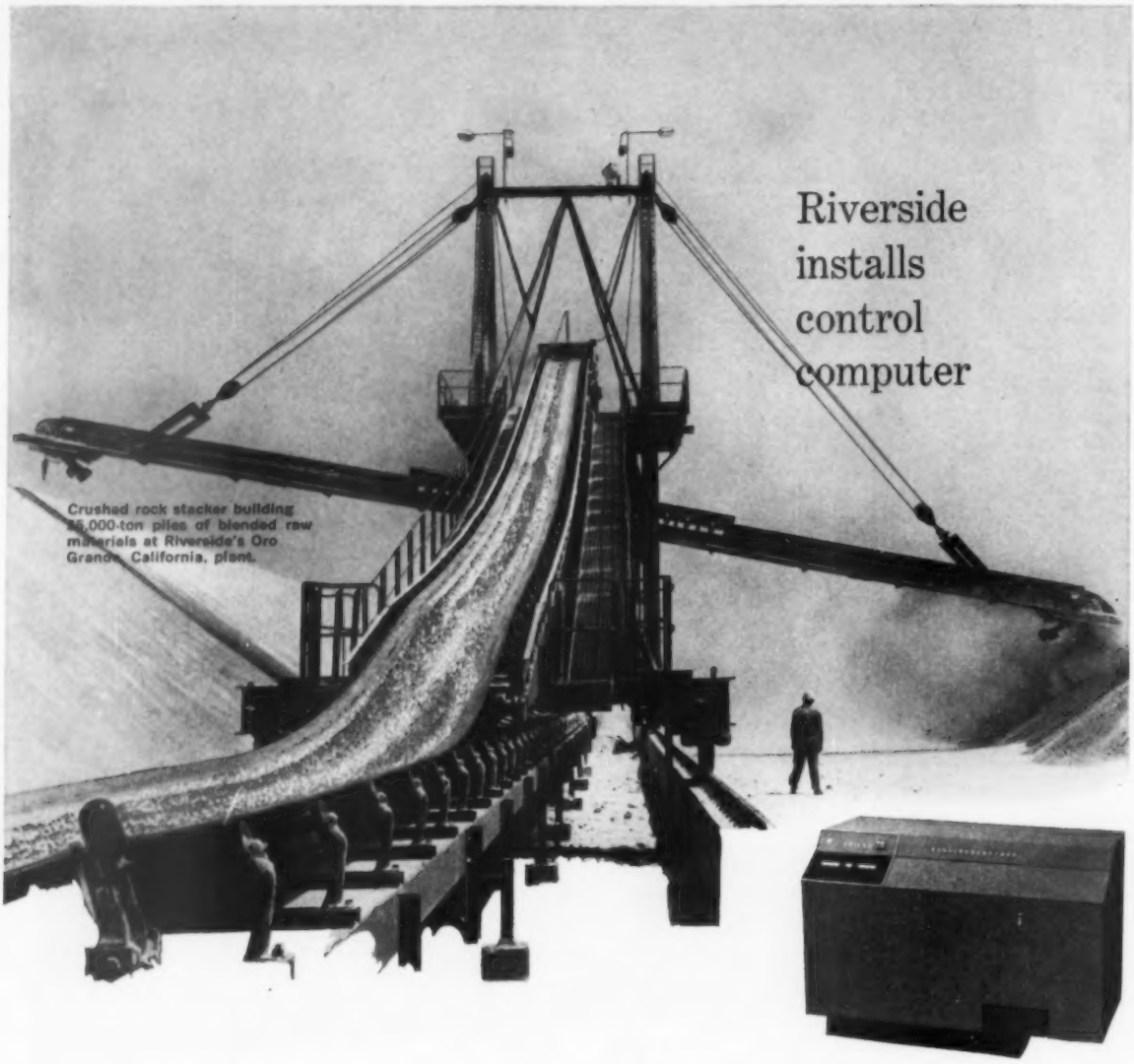
HOW TO INCREASE CEMENT PRODUCTION UP TO 50%...

The capacity of an existing tube or compartment mill can be increased up to 50% or even higher simply by installing a Bradley Hercules Mill as a preliminary pulverizer on either the dry raw or finish side. Yet this increased production of cement raw material or finished cement is obtained at no increase in horsepower consumption per ton or barrel produced. The Hercules automatic electrical feed control eliminates manual operation. Rugged construction . . . dustless operation . . . easy accessibility to grinding parts keep maintenance costs at an absolute minimum. That's why so many in the cement industry rely on the Hercules Mill for increased production of finished material.

See Chemical Engineering Catalog or for complete information, write for Catalog No. 63

BRADLEY PULVERIZER CO. LONDON ALLENTOWN, PA. BOSTON

superior grinding equipment since 1891


Riverside
installs
control
computer
Crushed rock stacker building 25,000-ton piles of blended raw materials at Riverside's Oro Grande, California, plant.

RW-300 DIGITAL CONTROL COMPUTER

to automate cement manufacturing

Riverside Cement Company, Division of American Cement Corporation, a leader in the use of advanced equipment and techniques, has installed an RW-300 Digital Control Computer to guide the blending of raw materials, to collect and analyze data from rotary kilns, and—ultimately—to control the kilns. Continuing more than two years of joint effort, engineers from Riverside and Thompson-Ramo-Wooldridge Products are now developing the mathematical model required for closed-loop control of the kilns. They expect computer control of cement manufacturing to increase plant capacity, reduce operating costs, and improve quality control.

For further information, call or write: Mr. Raymond E. Jacobson, Director of Marketing, The Thompson-Ramo-Wooldridge Products Company, 202 North Canon Drive, Beverly Hills, California, BRadshaw 2-8892.

THE THOMPSON-RAMO-WOOLDRIDGE PRODUCTS COMPANY

a division of ***Thompson Ramo Wooldridge Inc.***

When it comes to shovels...

rock separates the men from the boys!

When you're working in rock here's shovel-muscle you can depend on — the Bucyrus-Erie 38-B. It has big, cool-running clutches with the heft and stamina for high-cycle output . . . a tight, compact main-machinery arrangement that keeps shafts, gears and pinions in perfect alignment, keeps them running smooth on anti-friction bearings . . . a husky, annealed cast steel truck frame and axles. And at the business end of a 38-B is a dipper with higher resistance to both abrasive wear and impact shocks.

A man-size rock assignment is no place to take chances . . . you want the low-cost-per-yard, high output that a Bucyrus-Erie 38-B is built to deliver. Get all the facts soon from your distributor or write Bucyrus-Erie Company, South Milwaukee, Wisconsin, Dept. 49EA.

BUCYRUS ERIE®

Builds Better Equipment

sance. It averred that the making of cement is a lawful business which could not be conducted in any other location without the abandonment of its valuable property. The higher court reversed the lower court's decision in view of this argument.

Other higher courts have held that cement companies must install modern equipment to eliminate as much dust from the air as is possible. In other instances the courts hold that the cement company may be liable in nominal damages to adversely affected property owners.

Purchase Price of Plant Is Taxable

An official of a cement company wrote in part, as follows: "Recently our company sold certain materials for shipment to a purchaser in a foreign country. The tax commissioner in our state filed a lien to secure payment by the purchaser of 3 percent sales tax. Can the commissioner collect these taxes? What legal rule is available to determine whether nonmetallic products and materials are subject to taxation by tax authorities in our state where such materials are shipped to purchasers in other states?"

For illustration, in *Empresa Siderurgica, S. A. v. County of Merced,* 69 S. Ct. 995, the testimony showed these important facts, as follows: A cement corporation sold a plant to a corporation located in a foreign country. The state tax authorities levied sales taxes on the selling price.

The purchaser of the plant appealed to the higher court, contending that it was not liable for payment of sales taxes to the state because the plant was being shipped outside the United States, and title to the plant passed to the purchaser at the time the sale contract was signed.

The Supreme Court of the United States held that the purchaser must pay taxes to the state, and said:

"Goods do not cease to be part of a general mass of property in the state until they have been shipped, or entered with a common carrier for transportation, or have been started upon such transportation in a continuous route or journey."

This court explained that this same rule of law is applicable to merchandising products such as rock, sand, gravel, and cement. In other words, if such products are not already started on their movement to a point outside the state, such products are subject to taxation by your state.

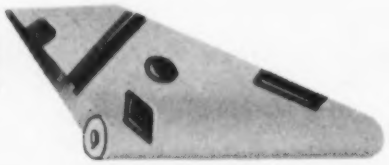
The Law of Riparian Owners

An official of a large sand and gravel corporation asked this legal question: "What is the law as to the lawful right of our company to take sand and gravel from the bed of a running stream of water? We operate a sand and gravel plant on a river and want to know the law as to where we can lawfully dig and take sand and gravel, and are we liable to lower property owners in damages we may cause them by temporarily diverting water?"

In *Smoot Sand and Gravel Corporation v. Washington Airport,* 51 S. Ct. 474, the testimony disclosed that a property owner in Virginia sued to prevent a sand and gravel company from obtaining gravel between the high water mark on the Virginia side of the Potomac River.

It is interesting to observe that the Supreme Court of the United States held the gravel company entitled to

REMA



ENDS LENGTHY SHUT DOWN

DUE TO CONVEYOR BELT DAMAGE

WITHOUT HEAT • WITHOUT HEAVY EQUIPMENT • WITHOUT PRESSURE

Minimum down time is assured when you use Rema cold vulcanizing repair materials for your belt injuries. With low cost Rema self-vulcanizing repair materials on hand your own maintenance men can make permanent repairs ON THE SPOT, QUICKLY AND EXPERTLY.

Repair by Rema is not just another cold patch. The rubber repair material is chemically prepared to cold vulcanize into an intimate mixture with your conveyor belt. This material possesses similar physical properties as the original conveyor belt. Simple tools are used to effect a repair that will prove as good as a hot vulcanized bond.

IMPORTANT! BELT CAN BE USED IMMEDIATELY AFTER REPAIR IS COMPLETED.

For belts used on an incline, Rema rubber cleats can be applied to increase the load carrying capacity and prevent back sliding of material. Rema cleats available in a variety of sizes can also be cold vulcanized to your belt.

For information regarding this repair material that is specifically engineered for conveyor belt damages write:

Distributor inquiries invited.

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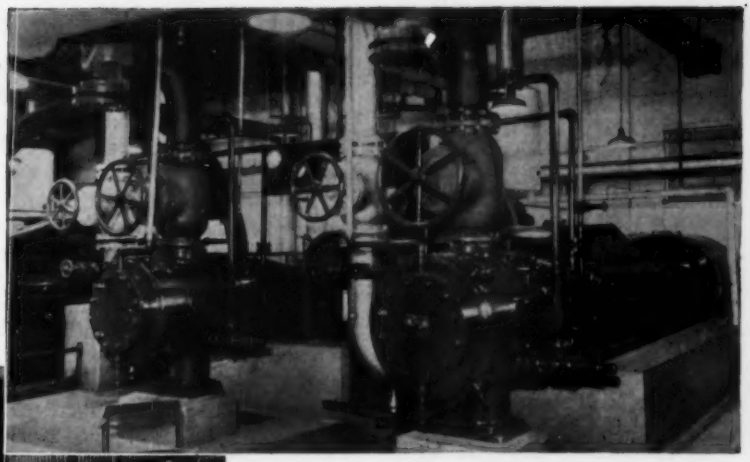
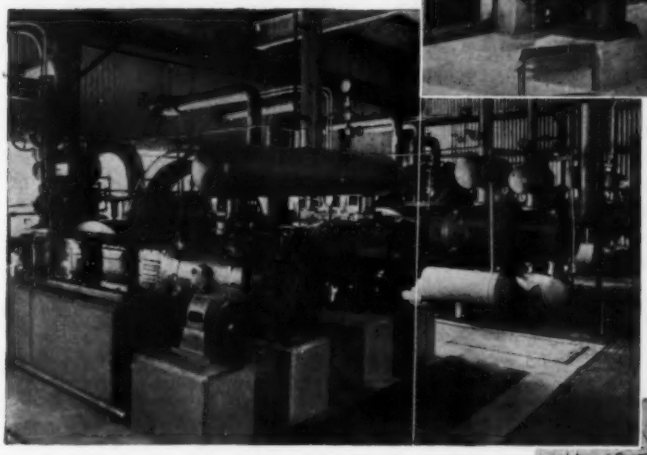
SAVE with STEAM



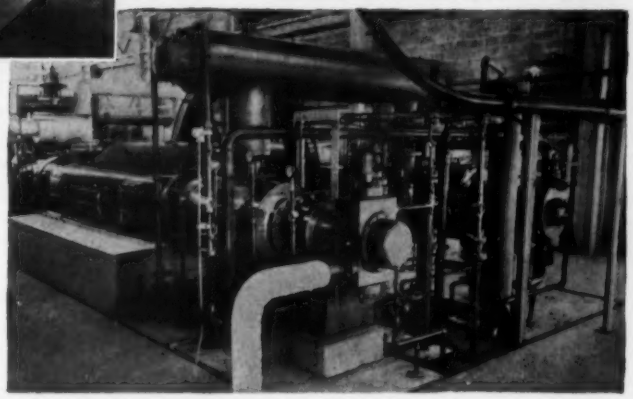


REFRIGERATION

One of two Ingersoll-Rand XPV compressors handling ammonia for refrigeration in a large Midwestern plant. Two of these modern units are installed in the space formerly occupied by a single old-type compressor, and provide greater capacity with safer, more efficient operation and much less down time. Another XPV in the plant compresses air.

CATALYTIC CRACKING

Three XPV compressors in a large refinery: in foreground is a single-stage unit handling flue gas; two 3-stage units in background compress inert gas. There are hundreds of XPV's on all refinery services, including hydrogen recyclers with "NL" non-lubricated compressor cylinders.



UREA MANUFACTURE

This 860-hp XPV compresses carbon dioxide in four stages for the manufacture of urea. There are four XPV compressors in this chemical plant, including ammonia synthesis gas circulators.

Don't waste your steam—
use its power with . . .

steam-driven compressors

Ingersoll-Rand's modern steam-driven compressors can turn your steam into compression power to suit any process conditions. These heavy-duty XPV units are available in a complete range of sizes up to 1500 hp (other types to 4000 hp), for any pressure or vacuum and for most steam conditions. Compare the features of XPV compressors, and see the reasons for their unmatched performance records:

Dust-proof, leak-proof, fool-proof running gear—Completely sealed frame keeps dirt out, oil in. Full-floating precision aluminum bearings never need adjustment, so the unit may be kept sealed and on stream.

Filtered, full force-feed lubrication—Wear is minimized by pressure lubrication of all bearing surfaces. Proper oil is supplied by separate systems to running gear, compressor and steam cylinders.

Adjustable automatic steam cutoff and hydraulic governor permit close control and variable speeds to suit any process conditions.

Efficient compressor cylinders with Channel Valves—Ingersoll-Rand has more process compressor experience than any other manufacturer; this experience assures the proper compressor combination for your job.

Individual Analysis of your requirements, and soundly-engineered equipment to meet them—that's the backbone of Ingersoll-Rand's fine reputation. Call your I-R representative today for assistance with your process needs.

In engineered products, there's no substitute for experience.

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COMPRESSORS · GAS & DIESEL ENGINES · PUMPS · AIR & ELECTRIC TOOLS · CONDENSERS · VACUUM EQUIPMENT · ROCK DRILLS,

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Your Caterpillar Dealer's lot holds the best selection of used earthmoving equipment buys on the market. Here's why: His business is active—and he reconditions, classifies and guarantees his trade-ins so you *know* what you're getting. Here's how:

1 A **"BONDED BUY"** on used Cat-built equipment is your safest buy. It's a bonded guarantee, up to $10,000 of satisfactory performance on *all* parts during the guarantee period.

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3 A **"BUY AND TRY"** deal is just what its name implies. This protects you with your dealer's written money-back agreement.

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Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

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BEST BUYS IN NEW AND USED EQUIPMENT

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continue taking gravel from the Virginia side, and said:

"The boundary was the usual high water mark. . . so that the only question is whether anything has happened since to change the original line."

Also, the courts hold that the owner of land adjoining a navigable stream, who derived his title from the United States, owns land only to the high-water mark. The title to the bed of the stream is in the state. On the other hand, the law is settled that the owner of land upon a non-navigable stream is entitled to the center of it, unless his deed specifies otherwise. See *Lutesville Sand and Gravel Company v. McLaughlin,* 26 S. W. (2d) 892.

If deeds to both owners of land on opposite banks of a stream specify "to the edge" of the non-navigable stream, both deed holders own to the center of the stream.

For example, in *Florida Gravel Company v. Capital City Sand and Gravel Company,* 154 S. E. 255, a sand and gravel company filed suit to enjoin another gravel company from removing sand and gravel from portions of land lying within a running stream. This court stated important law, as follows:

"Now, it is well settled . . . in this country that the proprietor of the land on the margin, owns the bed over which the river passed."

Nevertheless, there are instances where an adjoining state owns only to the edge of the stream. Obviously under these circumstances, the owner of land in this state owns only to the edge of the stream.

As to the duty of a company toward owners of lower land on a stream, all higher courts agree that a lower riparian owner has the right to insist that the water in the stream shall not be unreasonably withheld by the owner above, or withheld for an unreasonable length of time. In other words, the upper riparian owner by virtue of his position has no right to interfere unreasonably with the natural flow of the stream so as to give the riparian owners below more or less than the usual quantity of water. On the other hand, a riparian proprietor has a right to make all the uses he can of the stream so long as he does not pollute it; divert it from its natural channel; take so much water as to interfere with the natural legal rights of owners of lower land; or deposit foreign matter in the stream which affects damage to the owners of lower land.

For instance, in *Destimone v. Mutual Company,* 162 Pac. (2d) 808, a property owner sued the Mutual Company for damages to his crops and land caused by this company's discharging water and sand on his land.

The higher court held the company fully liable.

For comparison, see *147 Pac. (2d) 945.* Here the owner of land on a stream of water sued a company for damages to his land caused by diverting water and sand from the stream. The lower court held the company liable, saying:

"There is ample evidence to sustain the decree of the trial court that the land was damaged by the appellant's wrongful discharge of waters and sand thereon."

This court went on to explain that in cases of this kind the proper measure of damages for the loss of a growing crop is its actual value at the time it was ruined. This value may be ascertained either by evidence showing the reasonable value of the crop at the time of the loss, or the market value at the time of maturity, less the cost of cultivating, harvesting, and marketing.

For further comparison, see *Clifford v. State,* 148 Pac. (2d) 302. A property owner sued a sand and gravel company to recover $25,000 damages to his land allegedly caused by unlawful encroachment.

In subsequent litigation, the legal counsel for the company admitted encroachment upon the land. He had a jury inspect the property and listen to the testimony of three experienced realtors and appraisers who were familiar with real estate values. These three witnesses testified that originally the property was worth approximately $35,000 and that the depreciation in value resulting from the encroachment upon the property was $10,000.

The higher court held the company liable to the property owner for $10,000 damages, instead of $25,000 for which the property owner asked.

(*Continued on page* 178)

Manufacturers' News

R. B. Steinmetz

W. E. Sprackling

RICHARD B. STEINMETZ has been elected president of Anaconda Wire & Cable Company, a 70 percent owned subsidiary of The Anaconda Company. He succeeds WILLIAM E. SPRACKLING who is retiring. Mr. Sprackling will remain as a director of the subsidiary.

Mr. Steinmetz, an electrical engineering graduate of Cornell, class of 1922, has been associated with the Anaconda organization since 1929. His early years with the company were spent in electrical engineering assignments, and as a district sales engineer in several major cities. Throughout the war he was a special Washington, D. C., representative handling Army and Navy wire requirements. Serving in positions of increasing responsibility, Mr. Steinmetz became executive vice-president in 1957.

Mr. Sprackling has been a key leader of the company during the period of its greatest growth. Before joining Anaconda, he was general manager and later president of Tubular Woven Fabric Company in Pawtucket, R. I. When Anaconda Wire & Cable Company was formed in 1929, the Rhode Island company became one of Anaconda's divisions, and Mr. Sprackling was named a vice-president of the new company. Until 1947, he directed the sales organization. He then moved up to executive vice-president and was given the responsibility for the overall operating direction of the company. He was elected president in 1957.

The Western-Knapp Engineering Company has named WALTER R. SHAW project engineer, responsible for design, layout, and process engineering on chemical and ore processing plants.

Mr. Shaw has over 10 years' engineering experience in the chemical and metallurgical fields. Before joining WKE he was resident manager of a seawater magnesia and basic refractory material plant of the H. K. Porter Company, Inc.

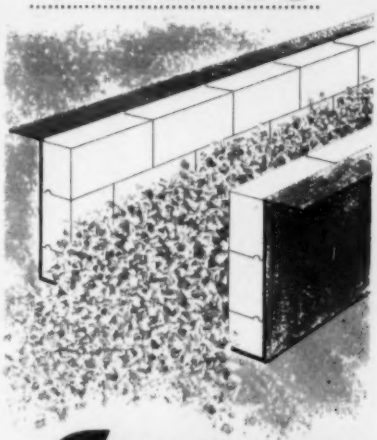
The appointment of KENWORTHY J. TOMPSON as works manager of its plants in Milwaukee County has been announced by Chain Belt Company, Milwaukee, Wis. As works manager, Mr.Thompson will be responsible for manufacturing and production in the company's chain and transmission division, heavy machinery division, and foundries. He will also be responsible for the operations of the methods and tool design, Milwaukee personnel and Milwaukee maintenance departments.

WILDER E. PERKINS has been appointed factory manager of the Manhattan Rubber Division of Raybestos-Manhattan, Inc., Passaic, N. J. He previously was co-manufacturing general manager with R. J. GORECKI who recently resigned. Mr. Perkins joined Manhattan in 1926 as a laboratory engineer. Other appointments are: A. J. VAN BENSCHOTEN, director of purchases, and G. HELLERMAN, manager of traffic and transportation.

MacDonald Engineering Company, Chicago, Ill., has announced the election of the following officers: N. B. THOMSEN, executive vice-president; J. W. MACDONALD JR., vice-president and secretary; O. L. NEWHOUSE, vice-president; R. C. WHITE, vice-president.

In Chute Linings...

OUTWEARS HARDENED STEEL 6 TIMES



ARLCITE® WEAR BLOCKS

Field tests prove the amazing wear resistance of ARLCITE Blocks in chuting the most abrasive ores and materials—up to six times the useful life of hardened alloy steels!

Tough-bond high-density ARLCITE is a super-ceramic block with hardness next to diamond. The exclusive tongue and groove design insures a tightly-keyed lining, is easily laid-up in the chute and resists wear evenly due to the uniform hardness throughout the block.

Investigate the money savings ARLCITE can bring in *your* material handling. Write us!

PORCELAIN DIVISION
FERRO CORPORATION
East Liverpool, Ohio

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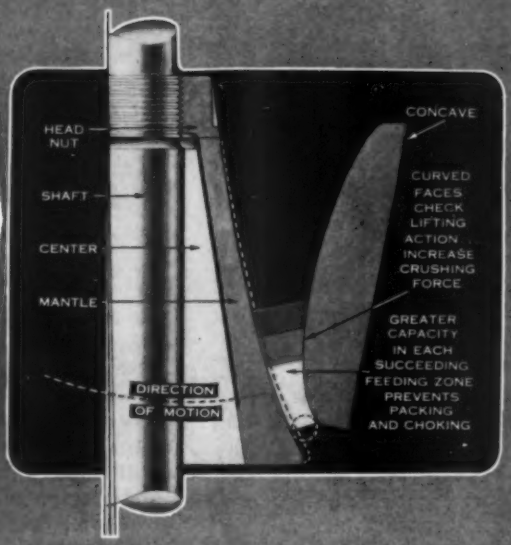
type TY

GYRATORY CRUSHER

Traylor-made

for uniform secondary reduction

Traylor TY Reduction Crushers require minimum floor space and little head room, with features that combine high production, economy of operation and lower maintenance costs.



Traylor's curved concaves used in the TY Crusher enable operators to secure large tonnages of small product of uniform size with low percentage of oversize and waste fines. Traylor TY Reduction Crushers are built in six sizes from 1'-3" to 5'-6" and with feed openings from 3" to 22". Write for bulletin #8112 today!

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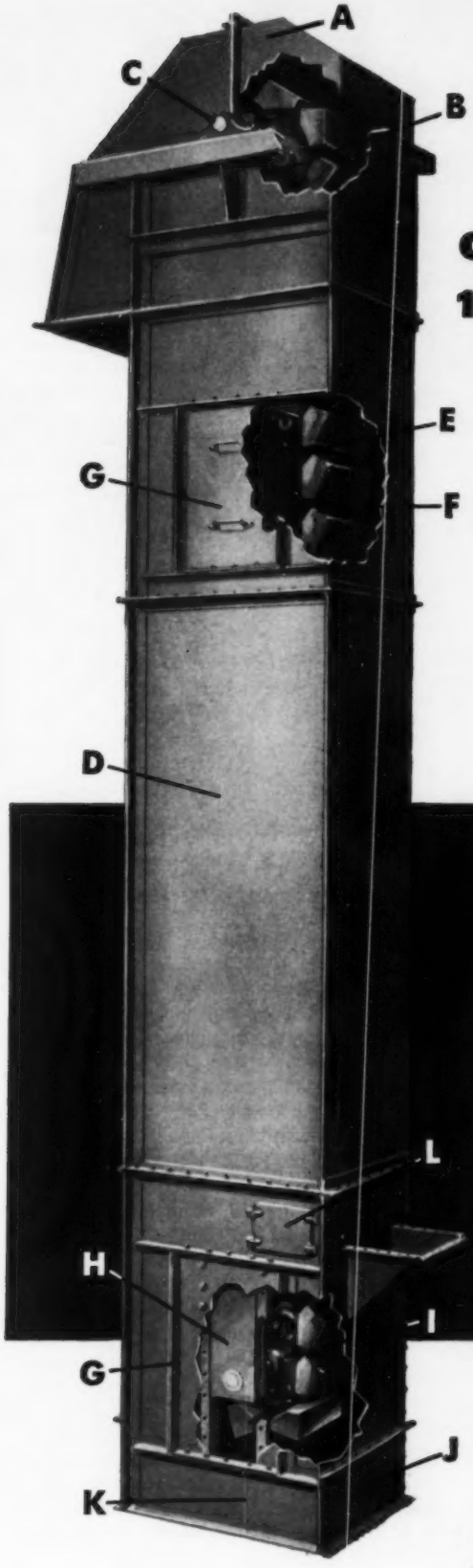

Cement Mill Elevators... 15 to 470 tons per hour

You get matched Jeffrey-built components throughout in Jeffrey cement mill elevators with engineering at its best for material handling systems. It's to your advantage to have one dependable source for design, manufacture and for guaranteed replacement parts.

Planning new facilities? Save both time and money by using Jeffrey's long-time application experience. Send now for Bulletin 950, or place a call for engineering assistance to The Jeffrey Manufacturing Company, 917 North Fourth Street, Columbus 16, Ohio.

A. Removable split hood for easy access to head section.

B. Traction wheel with renewable NI-HARD or hardened steel sectional rim.

C. Sealed heavy-duty antifriction bearings entirely outside of casing with dust seals around head shaft.

D. Dust-tight and weatherproof 10-gauge steel casing with reinforced corners. There's ample clearance between buckets and casing.

E. Increased capacity by closer bucket spacing. Lips and sides of buckets reinforced.

F. Equipped with heavy-duty steel knuckle chain assuring long life.

G. Large access doors for easy inspection and maintenance.

H. Internal gravity take-up assures constant and proper tensioning of chain and alignment of foot shaft.

I. NI-HARD or hardened steel sectional rim foot sprocket. Rim sections easily replaced when worn.

J. Cleanout doors at front and rear.

K. Steel bottom plate assures easy cleanout.

L. Hinged inspection doors.

JEFFREY

CONVEYING • PROCESSING • MINING EQUIPMENT...
TRANSMISSION MACHINERY...CONTRACT MANUFACTURING

ROBERT R. COXEY has been named sales engineer for the southeast states by Cross Perforated Metals, National-Standard Company, Carbondale, Pa. Mr. Coxey will be based in Charlotte, N. C., and will cover the coastal states south of the Mason-Dixon line for Cross industrial preforated metal sheets, Cross preforated steel screens, and *Conidure* and *Rima* screens for aggregate and mining. Mr. Coxey formerly was an independent manufacturers representative and had been sales vice-president of the Industrial Silica Corporation, Youngstown, Ohio.

Appointment of FRED DOLTON as national account representative for the *Michigan* line of construction machinery has been announced. Mr. Dolton's new duties include coordination of sales between *Michigan* construction and bulk material handling equipment distributors throughout the country and multi-operation users with centralized purchasing policies. He was formerly eastern district representative.

J. M. DUNCAN has been named manager, industries group sales, Washington office, and B. G. CAMP, manager of the Atlanta district of the Allis-Chalmers Manufacturing Company.

Mr. Duncan, who had been manager of Allis-Chalmers Atlanta district since 1956, succeeds W. P. BELL, recently named sales manager, small, medium and marine units, Allis-Chalmers steam turbine department. Mr. Camp has been a sales representative in Allis-Chalmers Charlotte district since 1946.

L. RICHARD MALLEY has been appointed advertising manager of Climax Molybdenum Company, a division of American Metal Climax, Inc. In his new post, Mr. Malley will coordinate the advertising, publicity and sales promotion activities of Climax's several product departments. Previously he was assistant to the president of American & Foreign Enterprises, Inc., serving as liaison between American and European industrial firms.

H. A. Bourne

R. H. Jackson

Two new positions have been announced by the Boston Woven Hose & Rubber Division of the American Biltrite Rubber Company, Cambridge, Mass. HARRY A. BOURNE has been appointed vice-president, manufacturing. RANDOLPH H. JACKSON has been appointed vice-president, sales. Mr. Bourne has been factory manager for the last two years. Mr. Jackson has been director of sales for the last three years.

General Mills, Incorporated, has announced that it has acquired the business and assets of Magnaflux Corporation of Chicago, Ill., pioneer in the development of techniques and equipment for detecting hidden flaws in industrial materials. Magnaflux Corp., a leader in non-destructive testing, will continue in business at its present location in Chicago and under the same name as a wholly-owned subsidiary of General Mills.

F. B. DOANE will retire as Magnaflux president and chairman of the board, but will continue to serve the company as a consultant. General Mills reports that key officers and personnel of the Chicago company will be retained in their present positions.

R. A. WILSON, General Mills vice-president and general manager of its mechanical division, will be the new president of Magnaflux Corporation. W. C. BABCOCK, of General Mill's legal department, will be secretary. Other officers who remain with the Chicago corporation are: W. E. THOMAS, executive vice-president; C. E. BETZ, vice-president and assistant to the president; W. D. REID, vice-president, manufacturing, and treasurer; R. O. SCHIEBEL, vice-president, marketing; HAMILTON MIGEL, vice-president, research and engineering.

Wherever Ore Moves, SCOOT-CRETE

Ore Carriers Move It • FASTER • EASIER • AT LOWER COST

SCOOT-CRETE CD-4, shown being loaded in mine, will carry up to 15 tons payload. Model CD-3N has 5-ton payload. Note driver's side-mounted position for maximum vision and efficiency, forward and rear.

***Throughout the world,* SCOOT-CRETE gives top-rate performance. No rails needed, no ties, no cars, no independent power source. Diesel-powered for operation inside the mine, SCOOT-CRETE carriers are rugged for around-the-clock service; carry up to 15 tons at speeds to 15 mph, climb grades up to 18%. Available with standard or fully automatic transmission. SCOOT-CRETE has equal speeds forward and reverse for fast shuttle service. All CD models approved by U. S. Bureau of Mines for underground mining.**

Units available from 3,000 lb. to 15-ton capacity. Write for specifications and literature. See your Dealer.

GETMAN BROTHERS

SOUTH HAVEN, ZONE 6, MICHIGAN

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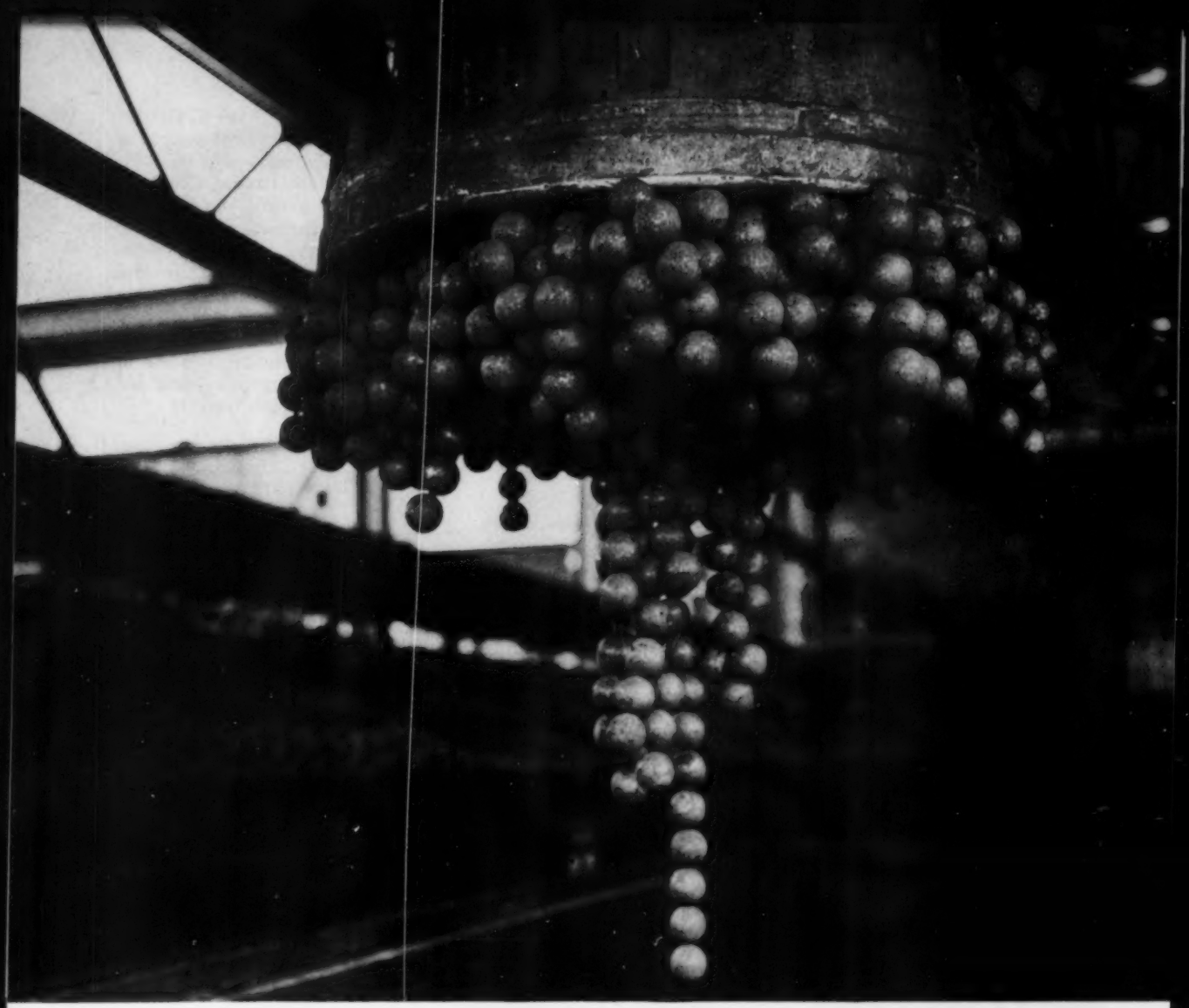
Enter 157 on card, page 167 ➔



Need grinding balls in a hurry?

CONTACT UNITED STATES STEEL! If all of a sudden you find you're caught short on grinding balls, you can get them fast from United States Steel. For example, a plant in Indiana recently phoned our Indianapolis sales office and asked if we could deliver 20,000 pounds each of 1¼- and 2-inch diameter USS Carbon-Manganese Grinding Balls to them *in two days!*

We did. The grinding balls were packed in drums, shipped via truck, and arrived at the Indiana plant on the morning of the day they needed them.

Though most companies place orders for grinding balls two to three months in advance, there are always emergencies . . . and United States Steel is ready to help you when that emergency develops. A complete stock of USS Carbon-Manganese Steel and USS Alloy Steel Grinding Balls is maintained at all times.

We can ship grinding balls almost any way you like: In 100-pound capacity burlap bags; in 2,000-pound capacity steel drums; in semi-trailer or dump trucks; in gondola or box cars (loose or in containers); or you can send your own truck if you like. The next time you need grinding balls contact the United States Steel sales office nearest you, or write or call United States Steel, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

USS is a registered trademark

USS

United States Steel Corporation—Pittsburgh
Columbia-Geneva Steel—San Francisco
Tennessee Coal & Iron—Fairfield, Alabama
United States Steel Export Company

United States Steel

Joy Manufacturing Company's Mining and Construction Division has announced the appointment of ARNOTT J. LEE as district sales manager, and GEORGE W. BERGMAN as assistant sales manager for its Chicago-St. Louis territory. Mr. Lee will make his headquarters in Chicago; Mr. Bergman will be located in St. Louis. The territory includes Indiana, Illinois, Iowa, Missouri, Arkansas, Kansas and the eastern parts of Nebraska and South Dakota.

A new engineering company, P-T Engineering Company of Denver, has been established with offices in Denver, Colo. It will specialize in the designing and engineering of overland conveyor systems, crushing, screening and washing plants and all phases of bulk materials handling systems.

Officers of P-T Engineering Company of Denver are: HARRY C. BULLOCK, president; J. R. TORPEY, vice-president and chief engineer; JOHN FLYNN, secretary-treasurer.

Two engineering promotions have been announced by Bucyrus-Erie Company, South Milwaukee, Wis. DONALD E. BARBER has been named product engineer in charge of the electrical section of the large excavator division. He joined the company in 1956, as an electrical engineer, following six years' service in a similar capacity at Fairbanks-Morse & Co., Beloit, Wis.

WILLIAM P. SCHLECHT is the new project engineer in charge of crane carriers and hoe front ends in the commercial crane and excavator division. He joined B-E in 1953, as a special apprentice, and had been a design engineer since 1956.

RODERICK W. ADAMS and DONALD C. TIBBALS have been named sales representatives for the explosives and mining chemicals department, American Cyanamid Company. Mr. Adams will serve Cyanamid customers in California, Nevada and Utah and Mr. Tibbals will cover the states of Colorado, South Dakota, New Mexico and Wyoming.

Appointment of JOHN K. GIBSON as supervisor of cement machinery sales has been announced by Allis-Chalmers Manufacturing Company. Mr. Gibson joined Allis-Chalmers in 1954 and has been an application engineer in the cement and pyroprocessing machinery section since 1956. He has engaged in processing machinery pilot plant and research work at Allis-Chalmers and has participated in co-ordinating some of the company's largest domestic and foreign cement plant projects.

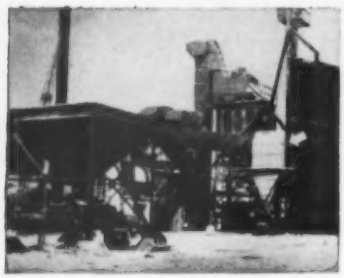
J. K. Gibson

Roy Belcer

ROY BELCER, for eight years a design engineer with Dorsey Trailers, Elba, Ala., has been named head of Dorsey's research and development. T. K. DORSEY, executive vice-president, has assumed full charge of sales following the resignation of HORTON FICK, vice-president. HENRY DORSEY now fills a newly-created position, director of programming, with various departments in the production cycle under his control.

WEMCO, a Division of the Western Machinery Company, San Francisco, Calif., has named two additional distributors to handle its line of aggregate processing equipment. The central and northwestern portion of Florida will be served by Stevens Associates, Lakeland, Fla. Johnson & Dealman Incorporated, Newark, N. J., will distribute WEMCO equipment in the northern half of New Jersey.

Griffin Implement & Milling Company, Inc., Monroe, N. C. is a new distributor for Highway Equipment Company, Cedar Rapids, Iowa. They will handle the company's *New Leader* line serving a number of counties in North and south Carolina.



5 FULL YEARS
ON STONE DRIER
—HIGH-EFFICIENCY COLLECTION
—NO MAINTENANCE COST!

This Dustex Miniature Cyclone Collector has been on the job at Rock Road Construction Co. in Chicago for five years, and a second Dustex, for four years.

"We have yet to spend any money for maintenance and repair," the firm reports. "You claimed high-efficiency collection and low maintenance costs. Your claims have been fully substantiated."

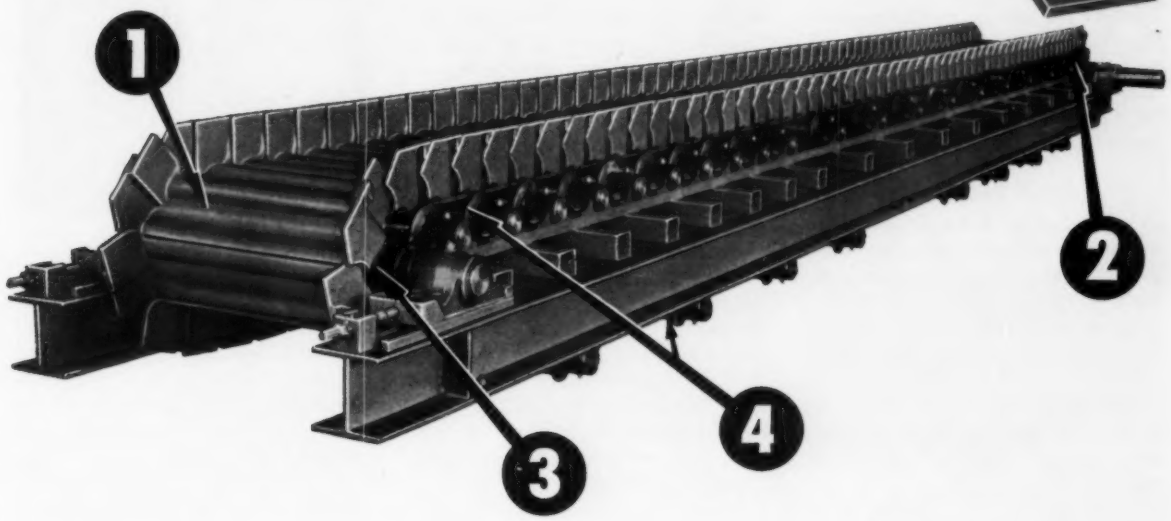
SEE ACTUAL COLLECTION PERFORMANCE
of Dustex on your site; at no cost or obligation! Write for this Dustex Bulletin, "A Simplified Test Method."

25 ANDERSON ROAD • BUFFALO 25, N. Y.

Dustex CORP.

Enter 157 on card, page 167

WHERE WEAR COUNTS!



TISCO® PAN FEEDERS

❶ **FEEDER PANS** — Hammered by tons of heavy rocks and ore every minute, but tough TISCO Manganese Chrome Steel pans lick impact and abrasion, outwear ordinary pan feeders 5 to 1.

❷ **HEAD SPROCKETS** — One break-down here flattens production. For dependable durability Manganese Steel does the job.

❸ **IDLERS** — Manganese Steel in this vital part keeps idlers busy, smooth running.

❹ **ROLLERS** — When each roller must continually shake off shocks and abrasion nothing wears like Manganese Steel.

Picture tons of heavy, abrasive material smashing down on this TAYLOR-WHARTON Pan Feeder, month after month without a breakdown. The reason — tough TISCO Manganese Steel soaks up shock and abrasion, keeps production climbing, maintenance down. For further information write to:

TAYLOR-WHARTON CO.

DIVISION OF HARSCO CORPORATION

Established 1742

HIGH BRIDGE 3, NEW JERSEY

PLANTS: Cincinnati, O. — Birmingham, Ala. — Easton, Pa.
SALES OFFICES: New York — Chicago — San Francisco

The Chicago Pneumatic Tool Company has announced the appointment of JOHN WYLDER as manager of CP's Boston district. The appointment fills a vacancy that resulted from the death of D. H. MCSHERRY in September.

Mr. Wylder has been with Chicago Pneumatic for 19 years, during which time he has held administrative and sales positions in the New York district. From his headquarters in Boston, he will direct the CP accounts in all of the New England states with the exception of Connecticut.

Promotion of JOHN S. HANSE to national trade sales manager, tires, of the General Tire & Rubber Company has been announced. He has been General Tire's Los Angeles division sales manager since 1955 and will succeed L. L. HIGBEE, who is voluntarily leaving the trade sales managerial post to become the company's western regional sales manager.

Appointment of PAUL K. BENJAMIN JR. as product manager, packing department, has been announced by Union Asbestos & Rubber Company, Fibrous Products Division, Bloomington, Ill.

In his new capacity, Mr. Benjamin will coordinate sales, product development, and manufacturing of all UNARCO packing and gasket products. He will also be responsible for asbestos specialty items, such as decorative asbestos cloth. Associated with UNARCO for the past two years, Mr. Benjamin has served the firm as a special project coordinator and as a member of the financial staff.

JOHN L. SHORTLEY has been appointed manager of the patent department of Hewitt-Robins, Inc., Stamford, Conn. From 1949 until 1950, he was a patent examiner in the U. S. Patent Office, Washington, D. C. Since 1951 he has been associated with the Washington office of the patent law firm of Munn, Liddy, Daniels, and March.

HENRY G. WALESCH has been appointed field sales manager for Ramset Fastening System, part of Olin Mathieson Chemical Corporation. He was formerly district sales manager for the Ohio-Pennsylvania-New York State area.

H. G. Walesch

J. Vilven

JOHN VILVEN has been named general sales manager for Massey-Ferguson Industrial Division, Wichita, Kans. He will head the division's over-all sales efforts, reporting directly to CORNELIUS WHETSTONE, general marketing manager.

Mr. Vilven has been serving the division as western regional industrial sales manager. Prior to that he was regional manager in the western region for Mid-Western Industries, Inc., whose patents and assets were purchased in mid-1957 by Massey-Harris-Ferguson, Inc., to become the Massey-Ferguson Industrial Division.

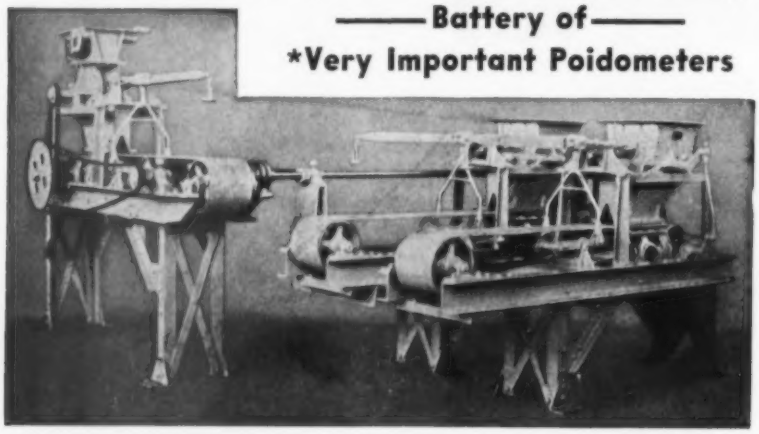
J. R. JONES has been appointed sales manager for the Kansas City district of the Multiwall bag division of West Virginia Pulp and Paper Company. Mr. Jones was formerly sales representative in western Missouri for the organization and is a 27-year veteran of the Multiwall bag business. He will oversee sales operations in Nebraska, Kansas, Missouri, and southern Illinois and Iowa.

AUGUST A. VERLEYE has been appointed to the combined post of sales statistician and automotive cost analyst for the automotive sales department of the Bendix Products Division, Bendix Aviation Corporation at South Bend, Ind. For the past thirteen years he has been a supervisor in cost accounting.

V.I.P.'s* in Process Industry

Battery of

***Very Important Poidometers**



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OVER 1500 now serving Industry

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Write for CATALOG NO. 5

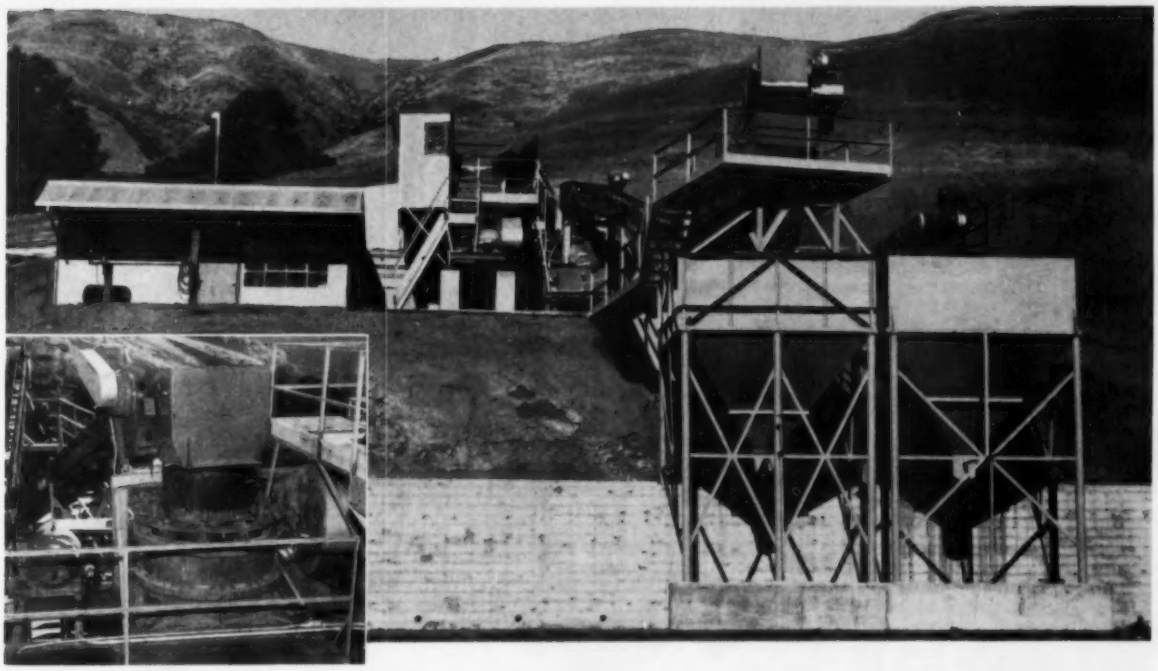
ALL Schaffer Poidometers are doing a vital job for bulk material producers in plants throughout the world. These fast, automatic, accurate scales provide *reliable* weight-data at any desired point. They keep production lines open, and assure peak output of uniform products. Poidometers are easy to install and operate, durable, and combine maximum service life with minimum maintenance and labor costs.

Available with total weight recorders, and remote control devices for showing and changing feed rate.

SCHAFFER POIDOMETER CO., 2828 Smallman St., Pittsburgh 22, Pa.

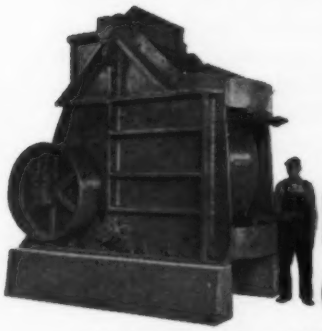
Enter 160 on card, page 167

Installs KUE-KEN® jaw and gyratory crushers for lowest cost-per-ton crushing



Having profited from over 5 times longer jaw plate life on a previous KUE-KEN crusher, Independent Construction Company, Oakland, California, has made its new push-button plant an entire KUE-KEN installation featuring greater capacity and lasting economy from longer jaw plate and liner life. KUE-KEN equipment includes a 36″ x 24″ primary jaw, 36″ gyratory, apron feeder, vibrating grizzley, 4 ft. x 10 ft. double deck Overstrom screen. Operating on the exclusive principle of "crushing without rubbing", KUE-KEN eliminates the main cause of premature jaw plate and liner wear. Power consumption is far less . . . power is used to crush rock, not to wear out plates. KUE-KEN jaw crusher mechanism operates in a sealed, dust-free crankcase lubricated by filtered oil to permit higher speeds for greater capacity and a more uniform product. Automatic flywheel release prevents breakage from tramp iron.

WRITE FOR CATALOG



KUE-KEN® CRUSHERS

"Crushing without Rubbing"

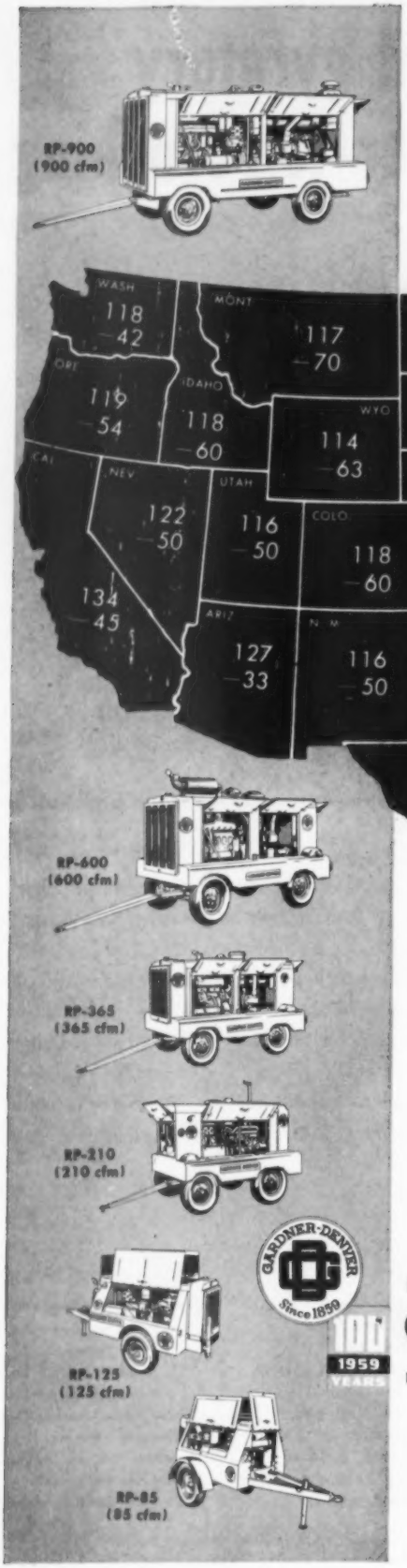
STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers · Gyratory Crushers · Overhead Eccentric Crushers
Revolving Screens · Classifiers · Feeders · Rib Cone Ball Mills
Concentrating Tables · Vibrating Screens

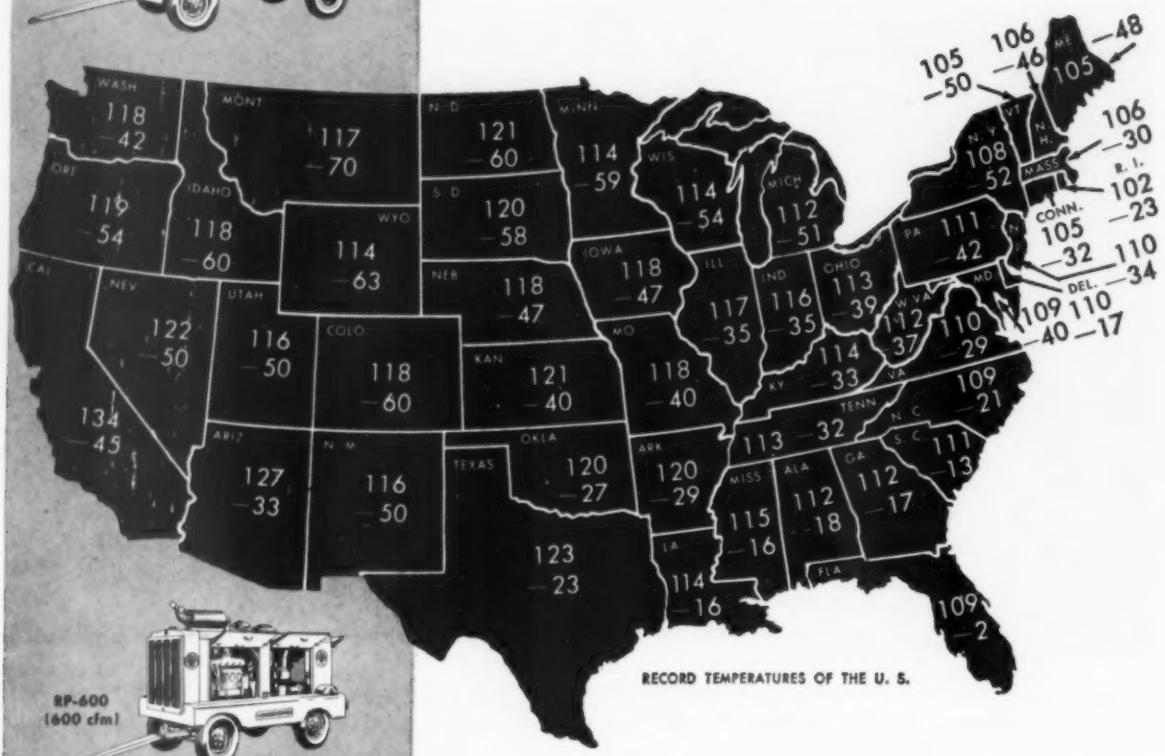
DEALERS:

SEATTLE, WASH.	Washington Machinery Co.
BUTTE, MONTANA	Hall-Perry Machinery Co.
VANCOUVER, B. C.	Universal Equipment Co.
SALT LAKE CITY, UTAH	Lund Machinery Co.
SAN ANTONIO, TEX.	Closner Equipment Co.
LOS ANGELES, CALIF.	Garlinghouse, Freman Co.
SAN FRANCISCO, CALIF.	Aggregate Engineers, Inc.
PORTLAND, OREGON	Air-Mac, Inc. of Oregon
BISMARCK, NORTH DAKOTA	Midwest Equipment Co.
PHOENIX, ARIZ.	Road Machinery Co.

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacture and Distributor, 323 S. Matlack St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England



How hot can it get in Idaho?



How cold in Florida?

Wherever your spread goes next—whatever the weather, you'll have the air power you need if Gardner-Denver rotary portable compressors are on the job. They're built for dependable, low-cost operation in all climates, any weather, any altitude. Choose from six sizes, 85 CFM to 900 CFM. Write for Bulletin RC-1.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

GARDNER-DENVER

Gardner-Denver Company, Quincy, Illinois

In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario

Here's what you'll find on Pit and Quarry's
BRAND NEW LIGHTWEIGHT AGGREGATE PLANT MAP

This map is big—33½ by 32 inches—and printed on extra-heavy paper suitable for framing or pasting. Listings include Canadian provinces in addition to continental United States.

Orders will be handled promptly at the following quantity prices—

1 to 10 maps	50c each
11 to 25 maps	45c each
over 25 maps	40c each

PIT and QUARRY PUBLICATIONS, Inc., 431 S. Dearborn St., Chicago 5, Ill.

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FOOTE BROS. DRIVES IN THE SAND AND GRAVEL INDUSTRY

Barber-Greene Photograph

When Consumers Co. a division of Vulcan Materials Company, installed Foote Bros. LINE-O-POWER Drives* at its Crystal Lake, Illinois crushed gravel plant, they expected top performance. They got it, plus a lot more.

Designed to produce 450 tons of crushed gravel per hour, the Crystal Lake plant has consistently averaged more than 520 tons per hour during the production year.

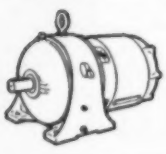
Dependable conveyor drives are important to *profitable* sand and gravel plant operation. Drives are subjected to high torque starting loads, heavy peak operating pressures, and tough, continuous operation. This is the kind of service for which LINE-O-POWER products are designed. That's why you see so many of them in every type and size plant.

There's a Foote Bros. unit available to meet your drive requirements. Your Authorized Foote Bros. Distributor is as close as your telephone. Ask him to recommend the right unit for your requirements.

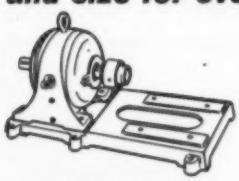
* *Including: 276 ft. long x 36" wide Fixed Stacker Conveyor from the Primary Crusher to the surge pile; 209 ft. x 30" wide conveyor to the Secondary Crusher; 311 ft. long x 30" conveyor to the Screening and Washing Plant.*

LINE-O-POWER PRODUCTS . . . A type and size for every need

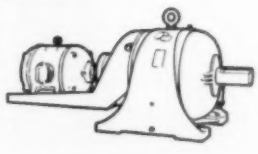
STRAIGHT LINE REDUCER



INTEGRAL GEARMOTOR



BASE-MOUNT



LINE-O-MOTOR

100 YEARS SERVING INDUSTRY 1859-1959

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Better Power Transmission Through Better Gears

Find Your Nearest Distributor In The 'Yellow Pages'

FOOTE BROS. GEAR AND MACHINE CORPORATION • 4571 S. WESTERN BOULEVARD • CHICAGO 9, ILLINOIS

New International UD-18A diesel, 125 rated hp @ 1,600 rpm, drives Island Supply Co., 6-in. sand pump with 48-in. dia. to produce 24 cu. yds. of gravel hourly for Bladen Sand & Gravel Co., Bladen, Nebr.

"We tried and failed to wear out our sand-sucking 12 year old trade-in"

"We needed more power," says Harold Crome, part owner of the Bladen Sand & Gravel Co., Bladen, Nebr., in explaining why his company traded a 12 year old International UD-18 for a new UD-18A pump engine, which delivers 125 rated hp at 1,600 rpm.

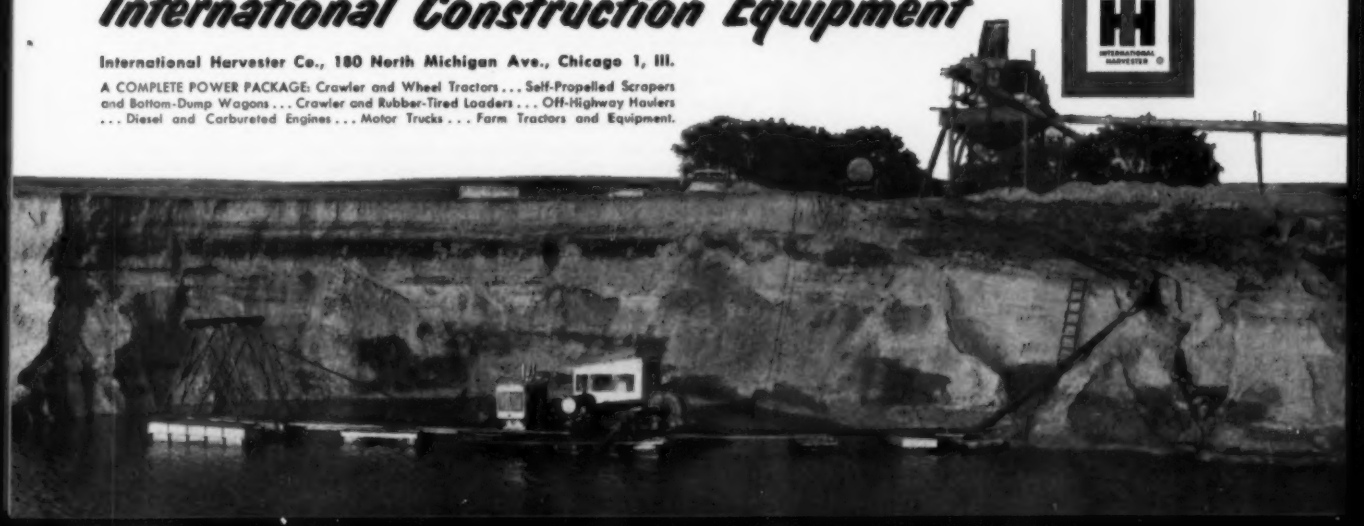
"Twelve years ago we put that UD-18 on our barge to power the big sand pump and we never could wear that sand-sucker out, although we sure tried," he continues. "It ran more than 16,000 hours pumping better than 20,000 yards of gravel each year. We got the additional horsepower we need in this new UD-18A, but whoever gets our old trade-in will get an engine that has at least 12 more good years of service."

If your pit or quarry needs diesel power that can breeze through more than a decade of low-cost dependable service like this UD-18, see your International Power Unit Distributor or Dealer. He sells and services 10 diesel engines ranging from 75 to 385 max. hp that only boost production, never operating costs. You'll find you can't beat the service you get from the power he sells plus the field service support he puts behind International engines on the job. Call him today.

International® Construction Equipment

International Harvester Co., 180 North Michigan Ave., Chicago 1, Ill.

A COMPLETE POWER PACKAGE: Crawler and Wheel Tractors . . . Self-Propelled Scrapers and Bottom-Dump Wagons . . . Crawler and Rubber-Tired Loaders . . . Off-Highway Haulers . . . Diesel and Carbureted Engines . . . Motor Trucks . . . Farm Tractors and Equipment.

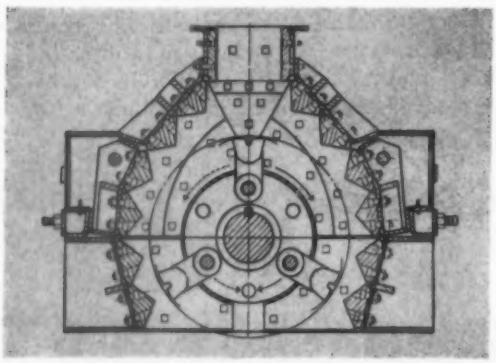


WILLIAMS REVERSIBLE IMPACTOR

Up to 250 tons of aggregate hourly with only 6 men!

Illustrated is Williams No. 445-X Reversible Impactor powered by 250-HP motor. Preceded by a 30 x 42 jaw crusher and apron feeder, and followed by gradation screens in closed circuit, up to 250 tons of aggregate per hour was obtained to meet these Tennessee Highway Dept. specs.:

100	Percent	1"	Passing
80-95	Percent	¾"	Passing
50-85	Percent	⅜"	Passing
36-65	Percent	No. 4	Passing
20-43	Percent	No. 16	Passing
10-21	Percent	No. 100	Passing



Cross section of Impactor. Note wide gap between hammers. High drop chute feeds rock between hammers so it is thrown against impact blocks to set up a ricochet action. Center impact blocks are adjustable with relation to hammers.

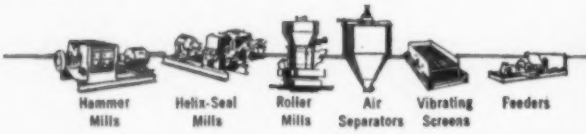
The beaming smile on Clarence Duke, co-owner of Burns Stone Company of Burns, Tennessee, indicates his complete satisfaction with the amazing output of his Williams Reversible Impactor. Hitting the Tennessee Highway Department's tightest aggregate specification right down the middle on the "fine" side, the Williams Impactor produced an average of 200 tons-per-hour, frequently reaching *250 tons hourly with only 5 men and Mr. Duke*. Performance was so gratifying he ordered another Impactor for the Burns Company plant at Cumberland Furnace, Tenn. Ben Ferguson, at right, is representative for Southern Machinery Company, Williams' distributor for middle Tennessee and north Alabama, which designed and furnished equipment for the Burns' plants.

HIGHER OUTPUT of BETTER PRODUCTS at LOWER COST

- **100% product sizing** is assured with a Williams Impactor
- **Lower upkeep expense.** No close clearances of impact hammers and blocks have to be maintained.
- **Reversible rotor** doubles life of wearing parts. Eliminates manual turning of hammers.
- **Completely open discharge** allows unrestricted flow of finished material. Closed circuit operation takes out crushed material as fast as made. No over-crushing or grinding.
- **Accessibility-plus!** Easiest of all crushers to service. Complete rotor removable without disturbing any feed mechanism.
- **Heavy steel plate frame**—forged steel oversize rotor shaft—extra heavy alloy steel hammers and impact blocks—many other exclusives insure longer, lower-cost operation.

Ask for brochure

WILLIAMS PATENT CRUSHER & PULVERIZER CO.
802 ST. LOUIS AVE. St. Louis 6, Mo.



WILLIAMS
CRUSHERS GRINDERS SHREDDERS
Oldest and Largest Manufacturers of Hammer Mills in the World

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

HANDLING SAND AND GRAVEL, ores, and other bulk materials with Sauerman machines is covered in a 16-page brochure published by *Sauerman Bros., Inc.*, in commemoration of its 50th anniversary. The brochure contains a brief history of the company and includes pictorial sections showing DragScraper and Cableway applications for excavating and hauling; storage and reclamation; engineering and construction; and the marine field. **(301)**

CARBIDE ROK-BITS, drill rods, striking bars, and extension steel are included in 12-page Catalog No. 759, recently revised by *Brunner & Lay, Inc.* Illustrations and specifications are given for each product in the company's line. The new line of rope thread blast hole drilling tools is detailed. **(302)**

COOLING TOWER DRIVES are described in a bulletin available from *The Cleveland Worm & Gear Company.* These compact speed reducers, known as Type-CU drives, quietly handle heavy-duty fans under extreme conditions of heat and humidity. The brochure gives sizes, dimensions, horsepower ratings, and other helpful information. **(303)**

A SLING CHAIN SAFETY KIT published by *The McKay Company* contains five folders, each dealing with a different aspect of chain safety. Pocketed in a handy 4x9 folder, the booklets provide answers to questions regarding the care, uses, and inspection of sling chains. **(304)**

A SPIRAL CONVEYOR BOOK from *The Jeffrey Manufacturing Company* offers engineering data, conveyor layouts, capacity tables, conveyor selection, and horsepower requirements. Sections devoted to couplings and shaftings, hangers, trough ends, unit drives, thrust bearings, and accessories round out the comprehensive information presented. Conveyor specification is detailed. **(305)**

EASTON TS-2635 REAR DUMP TRAILER with variable wheel base, which is used in combination with the Euclid Model 30 LOT single axle tractor, is described in a bulletin from the *Easton Car & Construction Company.* With a 35-ton capacity, the unit is known as the S-18 rear dump. Trailer specifications, weight distribution, tractor-trailer dimensions, and a performance chart are included. **(306)**

"ENAMELED MAGNET WIRES FOR HERMETIC MOTOR APPLICATIONS", a new publication from *Anaconda Wire and Cable Company,* is designed to aid in the selection of the correct magnet wire hermetic motors. The 19-page booklet includes a comprehensive table of test data for each of the types of insulation Anaconda recommends for hermetically sealed motor service—Anavar, Anatherm, Epoxy, Formvar, and Lecton. **(307)**

PREVENTIVE TRACTOR MAINTENANCE is the theme of a series of cartoons offered by *J. I. Case Company.* Suitable for tacking on walls, the 11x13" color posters feature cartoon characters in typical job situations. The series, keyed to seasonal problems, sells proper tractor maintenance in a humorous, enjoyable manner. **(308)**

SIZE 8E MOTOREDUCER has been added to *The Falk Corporation's* line of motor reducers. The unit features all-steel housing, large overhung capacity, positive lubrication, 98½ percent efficiency per gear mesh and extra depth high pressure angle gear teeth. A bulletin contains selection tables, dimensions, and weights. **(309)**

ROTARY DRYING EQUIPMENT manufactured by *General American Transportation Corporation* is described in Bulletin 59-L. Data covers design, con-

DECEMBER **PIT AND QUARRY** **1959**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

VOID AFTER 60 DAYS.

_____ _____ _____ _____ _____ _____

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Name_____ Title_____

Company_____

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We Produce_____

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more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

struction, application, and general application of Louisville rotary drying equipment. (310)

PRE-ENGINEERED SECTION BELT CONVEYOR Bulletin 458, available from *Stephens-Adamson Manufacturing Company*, features comprehensive technical data, pre-engineering advantages, and an exploded view of the new section belt conveyor with all components pointed out. (311)

TROY TURF, a living blanket of grass that carries its own seed, pH control, mulch, fertilizer, disease and insect control, and scientific seed germination medium is described in a booklet from *Troy Blanket Mills*. Troy Turf is available in standard 54-in. widths and wider. The 40-sq. yd. rolls are 80 ft. long. (312)

A BELT (STREAM) WEIGHER for feeding dry materials is the subject of a new bulletin from *B-I-F Industries, Inc.* The bulletin contains a photograph of the Model 36-20W Pneu-Weigh, lists its advantages, and describes its operation and accessories. A detailed dimension drawing is included. (313)

SYNTHETIC SURFACE ACTIVE AGENTS and detergents for industry are covered in a 24-page bulletin from *Swift & Company*. These products include various forms of liquid concentrates for wetting, emulsification, suspension, dispersion, etc., and solid materials for use as detergents, wetting agents, emulsifiers, etc. The bulletin gives chemical and application specifications for over 10 materials. (314)

"6 PLANS TO BUILD YOUR WORKING CAPITAL and Increase Your Profits", a booklet issued by *Standard Financial Corporation*, describes the firm's six financing plans: time sales and lease financing; non-notification accounts receivable financing; accounts receivable factoring; advances on inventory and chattel mortgages; funds for special situations; and consumer credit financing. (315)

THE TRANSALL BELT PULLER for installing and repairing conveyor belts is described in a bulletin from *Transall, Incorporated*. Model BP30 for 30-in. belts or smaller and Model BP42 for 42-in. belts or smaller are diagrammed and their features are listed. (316)

"HAULAGE MACHINES," Book 2892, contains 14 typical layouts that illustrate the types of applications to which *Link-Belt Company's* car spotters and car pullers can be adapted. The complete line of car spotters, car pullers, and 33 accessories are described in the new 20-page book, which also gives engineering and selection data. (317)

THE AMERICAN 700 SERIES TRUCK CRANE, with a 60-ton capacity, is featured in a catalog released by *American Hoist & Derrick Company*. Actual illustrations are shown taken on large engineering projects and big lifts. The catalog also describes the many exclusive features. (318)

MODEL C-6 CRAWLER TRACTOR is described in Form No. 607 from the *Euclid Division, General Motors Corporation*. The booklet is illustrated with photographs of job applications, cutaways, sectional views, and drawings that explain design and operating features. Condensed specifications and performance charts, as well as data on hydraulic and cable control attachments, are also included. (319)

SCIENTIFIC AND TEST INSTRUMENTS manufactured by *Minneapolis-Honeywell Regulator Company* are described in a 48-page condensed catalog. A brief description, typical illustration, salient specifications, and reference for additional information are given for each family of instruments. (320)

FIRST CLASS
PERMIT NO. 44
CHICAGO, ILL.

BUSINESS REPLY CARD
No Postage Stamp Necessary if mailed in the United States

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CHICAGO 5, ILL., U.S.A.

NEW SUBSCRIPTION ORDER FORM

Send PIT AND QUARRY to me for

____One Year $3* ____Two Years $5 ____Three Years $6

____Payment enclosed ____Bill me ____Bill company

Name_____ Title_____

Company_____

Address_____

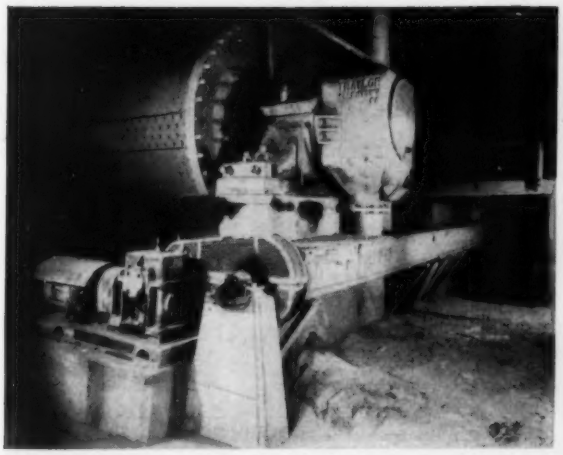
City_____ Zone_____ State_____

Type of business
and products _____

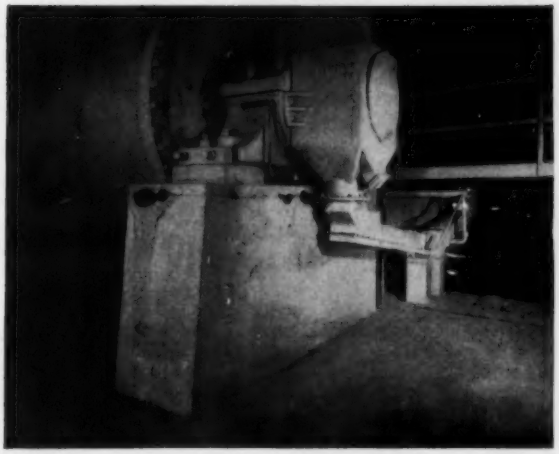
*U. S., U. S. Possessions, and Canada only.

Pan American countries, $10 a year; elsewhere, $15 a year.

The Arithmetic of Materials Handling



BEFORE: **Dirt, noise and mechanical breakdown** were constant problems in this cement plant, where two mechanical conveyors were used to collect raw materials. A 5 h.p. motor driving auxiliary equipment wasted valuable space and power, required frequent maintenance. Spillage clean-up wasted costly man-hours.



AFTER: **Clean, simple, quiet.** Notice the difference two 8" F-H Airslide® fluidizing conveyors have made. No dangerous moving parts. Nothing to lubricate. Auxiliary equipment and foundations are gone. Power needs are now only ⅛ of previous needs. Fluidizing saves wear and maintenance.

AIRSLIDE® Fluidizing Conveyor

minimizes material loss . . . maintenance . . . moving parts

If you are now handling dry, pulverized materials, the F-H Airslide Fluidizing Conveyor can help you stop noise, and air-pollution, as well as speed flow and reduce maintenance cost.

Simplicity Itself

F-H Airslide conveyors fluidize dry, pulverized materials with low pressure air.

These materials literally flow at high speed, down the inclined conveyor. Power requirements are small.

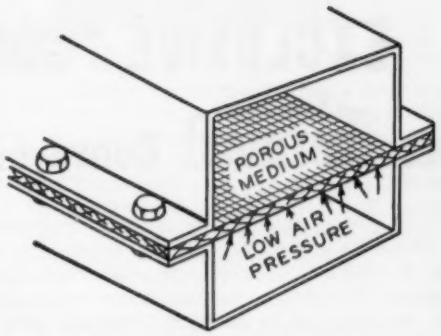
Flexibility, Low Cost

For unlimited applications, Airslide conveyors take up little space, and can be used singly and in combination with other Fuller pneumatic conveying systems. The movement of fluidized material can be around corners, between floors, through walls—nearly any conveying distance.

Better Housekeeping

Can Fuller conveying systems help eliminate your housekeeping problems—cut your maintenance and handling costs? Write today, outlining your problem in handling dry, finely-divided materials. Fuller will gladly make appropriate recommendations.

"Pulverized Materials Flow Like Water!"



FLUIDIZING PRINCIPLE: Porous supporting medium divides conveyor section into two "compartments". Dry material flows down inclined conveyor, fluidized by low-pressure air entering beneath porous medium.

FULLER COMPANY GENERAL AMERICAN

Fuller ....pioneers in harnessing AIR

FULLER COMPANY
100 Bridge St., Catasauqua, Pa.
SUBSIDIARY OF GENERAL AMERICAN TRANSPORTATION CORPORATION
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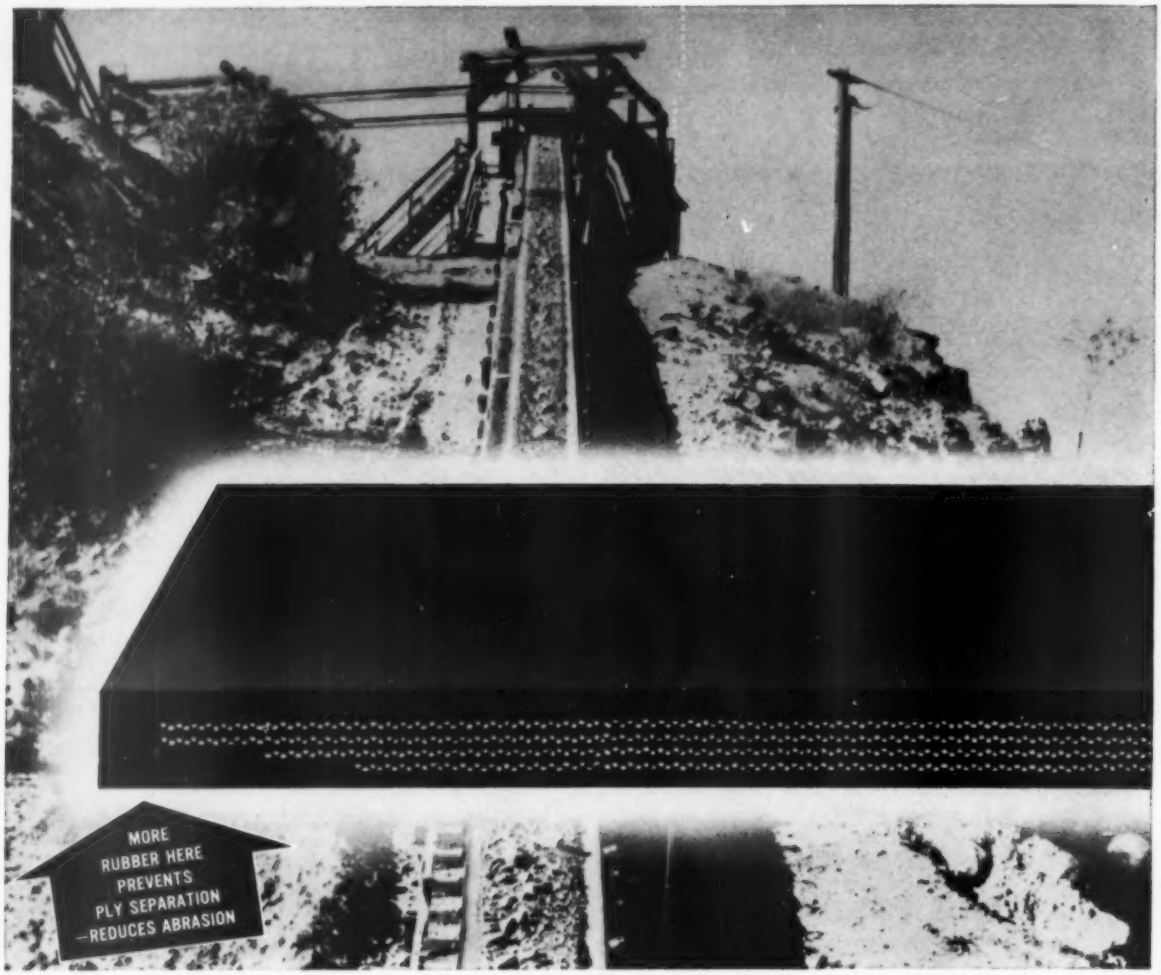


EXCLUSIVE "COLEDGE"* CONSTRUCTION

gives Quaker Thermoid Conveyor Belting extra life where it counts

Unique "Coledge" construction puts more rubber *at the edges* where it's needed, prevents ply separation, makes a more flexible and wear resistant edge where abrasion is greatest. Punishment at the edges—especially the tough use dealt out in quarrying—can kill most conveyor belting in a fraction of the lifetime of Thermoid-Quaker belting.

Tests show Thermoid-Quaker "Coledge" construction lasts and lasts on the same jobs where other belting fails. "Coledge" construction is available on all grades of Thermoid-Quaker belting.

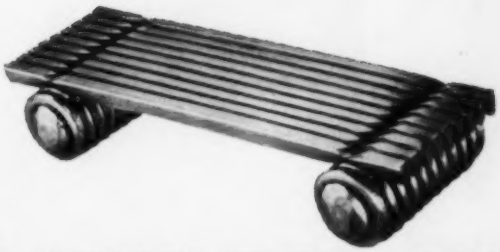
What's more, all Thermoid-Quaker conveyor belting is prestressed in manufacture, so that the belt is actually in compression when you get it—ready for the heaviest load without strain.

Examine Thermoid-Quaker Belting with the exclusive "Coledge" construction at your Thermoid distributor's, or write for further information to Thermoid Division, H. K. Porter Company, Inc., Tacony & Comly Streets, Philadelphia 24, Pa.

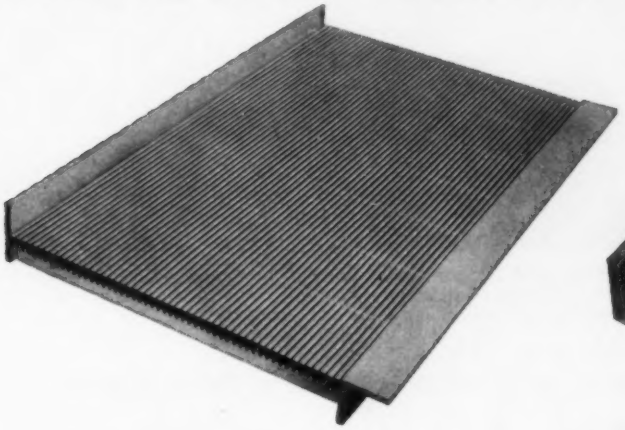
*Patent Applied For

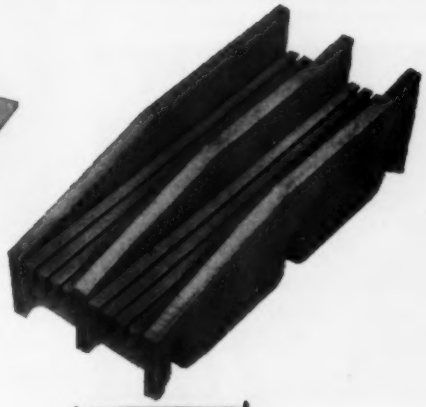
THERMOID DIVISION PORTER H.K.PORTER COMPANY, INC.

PORTER SERVES INDUSTRY: with Rubber and Friction Products—THERMOID DIVISION; Electrical Equipment—DELTA-STAR ELECTRIC DIVISION, NATIONAL ELECTRIC DIVISION; Specialty Alloys—RIVERSIDE-ALLOY METAL DIVISION; Refractories—REFRACTORIES DIVISION; Electric Furnace Steel—CONNORS STEEL DIVISION, VULCAN-KIDD STEEL DIVISION; Fabricated Products—DISSTON DIVISION, FORGE AND FITTINGS DIVISION, LESCHEN WIRE ROPE DIVISION, MOULDINGS DIVISION, H. K. PORTER COMPANY de MEXICO S. A.; and in Canada, Refractories, "Disston" Tools, "Federal" Wires and Cables, "Nepcoduct" Systems—H. K. PORTER COMPANY (CANADA) LTD.



GET 5 IMPORTANT BENEFITS IN THESE HENDRICK SCREENS





1 REDUCED CLOGGING AND BLINDING

2 PRODUCT UNIFORMITY

3 FASTER PROCESSING

4 REDUCED WEAR FROM ABRASION

5 FABRICATION TO FIT YOUR OPERATING CONDITIONS

Perforated Plate with Hendrick H Quality Steel
Full clearance in Hendrick Perforated Plate practically eliminates blinding, permits faster processing. Uniformity of mesh provides product uniformity. Heat-treated H Quality high-carbon steel resists abrasion and screen damage.

Wedge Wire
Free clearance in Wedge Wire reduces chances of clogging and blinding. Tapered profile bar provides maximum water flow, increases dewatering efficiency. Deep profile bar stands up under extra-heavy loads, lengthens service life. Riffle tops are available for operating conditions involving highly abrasive materials.

Wedge Slot Screens
Accurately spaced, uninterrupted slots permit faster processing and dewatering, reduce chances of blinding. For product uniformity, parallel head flanges maintain uniformity of openings. For resistance to abrasion, Wedge Slot is available with Skid Bars that protect the screen against large chunks. Hendrick will gladly help you select, from 8 profile bars, the type that will stand up best under your operating conditions.

Hendrick
MANUFACTURING COMPANY
Headquarters for All Your Screening Needs
39 DUNDAFF STREET, CARBONDALE, PA.

Perforated Metal • Perforated Metal Screens • Wedge-Slot Screens • Hendrick Wedge Wire Screens • Architectural Grilles • Mitco Open Steel Flooring—Shur-Site Treads • Armorgrids • Hydro Dehazers • Distillation Column Internals

Hendrick Manufacturing Co.
39 Dundaff Street, Carbondale, Pa.

Please send me your catalog on:

- ☐ H Quality Steel Perforated Plate
- ☐ Wedge Slot Screens
- ☐ Wedge Wire
- ☐ I would appreciate a call from a Hendrick Sales Engineer.

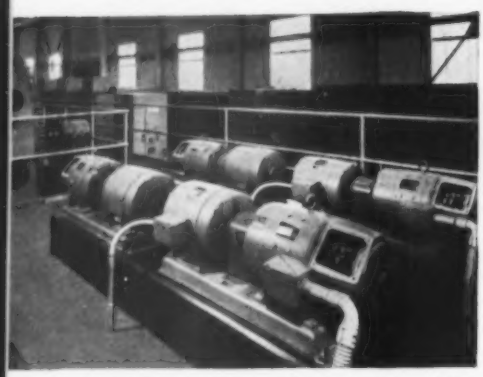
Name_____

Company_____

Address_____

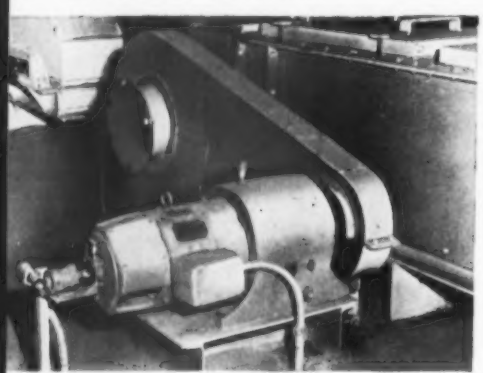
City_____ Zone_____ State_____

SAFE, RELIABLE unit substation distributes 480-volt power to auxiliary equipment in the Universal Atlas finish mill.

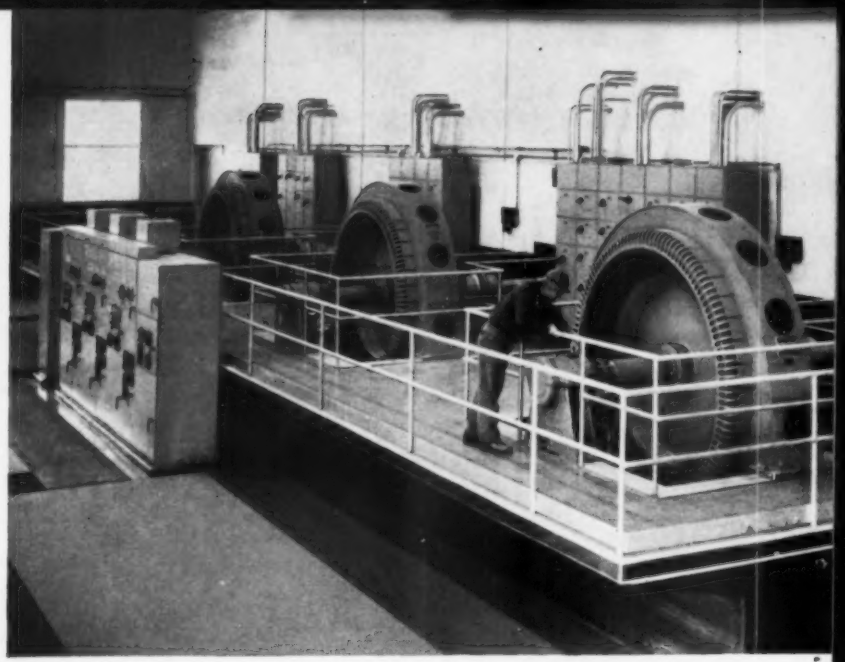


DEPENDABLE EXCITATION for the three 1000-hp finish mill motors is furnished by three G-E MG sets. A fourth set provides spotting power.

SYSTEM PROTECTION and control are supplied by G-E vertical lift metal-clad switchgear with overcurrent and ground relays. System coordination localizes fault areas.



SPACE SAVING G-E 5-hp, 125-rpm, heavy-duty gear-motors for finish mill feeders have special seals in gear housing to give long life in cement mill service.



THREE RUGGED General Electric 1000-hp finish mill motors with high torque, stator shift and full voltage starting combine with Limitamp* starters and spotting control to simplify operation, maintenance and inspection.

At Universal Atlas, past performance proves . . .

Tough jobs need rugged General Electric systems

By adding three grinding mills and a clinker-burning kiln, Universal Atlas Cement Division of U. S. Steel Corporation recently increased annual capacity of its Hudson, New York, plant by more than one-third.

This kind of cement production needs electrical equipment with a built-in profit—rugged, dependable motors and control backed up by switchgear with long-term reliability—the qualities that help erase the cost of downtime from the annual budget.

Engineering coordination saves time, expense—Through close coordination with Universal Atlas engineers and representatives of The Rust Engineering Company, prime contractors for the project, G-E engineers helped design the most efficient and economical electrical system for this plant.

General Electric supplies complete electrical system—A factor in selecting General Electric to supply the complete electrical system for the Universal Atlas expansion was the 20-year record for reliable trouble-free operation provided at the plant by General Electric equipment. In addition, General Electric's experience with electrical systems for cement production provided expert application engineering assistance.

Contact your nearest G-E sales engineer—For more information, contact your nearest General Electric Apparatus Sales Office or write to General Electric Company, Section 658-23, Schenectady 5, New York.

*Registered trade-mark of General Electric Company.

Engineered Electrical Systems for the Cement Industry

GENERAL ELECTRIC

Appointment of W. SCOTT FITZ JR. as market analyst for Kennametal Inc., Latrobe, Pa., has been announced. Mr. Fitz will work on marketing problems of Kennametal's metalworking and mining divisions in the Latrobe headquarters of the company. He was formerly with Joy Manufacturing Company as manager of its rock bit division in Claremont, N. H.

W. S. Fitz Jr.

R. G. Allen

ROBERT G. ALLEN, president and chief executive officer of Bucyrus-Erie Company, South Milwaukee, Wis., has been appointed to the planning council of the American Management Association's general management division. Mr. Allen is one of six new members recently named to the Council which is headed by Paul B. Wishart, vice-president of the AMA and president of Minneapolis-Honeywell Regulator Co.

The new appointees will join with other top executives from all parts of the country in serving the AMA on a voluntary basis. These men provide advice and counsel to the association staff in the planning of meetings, seminars, conferences, etc. for the yearly program of the general management division.

Transwall Folding Partition Division of Bemis Bro. Bag Co. has been purchased by Waco Manufacturing Company, Minneapolis-based firm whose divisions serve the construction industry and the school and institutional markets.

Under the new management, the Transwall Division will continue to produce its lines of folding partitions for industrial and institutional use and will operate through its present distributors, HENRY P. ALBRECHT, Waco president, said.

CHARLES D. HOWELL has been appointed assistant vice-president—manufacturing by the Westinghouse Air Brake Company, Pittsburgh, Pa. In this capacity, he will have responsibility for general office staff supervision of all maufacturing activities of the company's domestic operating units.

Mr. Howell comes to Westinghouse Air Brake Company from the Ford Motor Company, where he has spent seven years in various managerial positions involving responsibilities related to production, manufacturing and cost matters.

The Louis Allis Company, Milwaukee, Wis., manufacturer of electric motors, generators and adjustable speed drives has announced the construction of a new research and development center in the neighboring suburb of Greendale, Wis. The building, which will be staffed by 100 engineers and technicians, will double the size of the present engineering and physics laboratories.

Two top-level engineering appointments were annouced recently by Massey-Ferguson Industrial Division, Wichita, Kans.

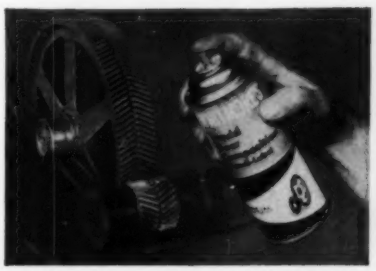
HENRY J. THOMAS, Milwaukee, Wis., who has had wide experience in earth-moving and construction equipment design, was named chief engineer. In the post he will supervise all engineering activities of the industrial division, and will maintain close liaison with the company's vice-president, engineering, and his staff at Detroit, Mich.

Named consulting engineer was J. I. MICHAELS, Wichita, who designed the first gleaner combine in 1922. He will assist the chief engineer in supervision of engineering activities and will specialize in technical aspects of design and the specifications of materials and parts.

Appointment of JOHN C. ORTH as an application engineer in the processing machinery department has been announced by Allis-Chalmers Manufacturing Company, Milwaukee, Wisc.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!



HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal—no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300%—special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

- Open Gears, Dipper Sticks, Cams
- Enclosed Gear Cases
- Wire Rope and Cable
- Hydraulic Units, Torque Converters
- Roller, Ball, and Sleeve Bearings
- Speed Reducers

Est. 1893

THE WHITMORE MANUFACTURING CO.

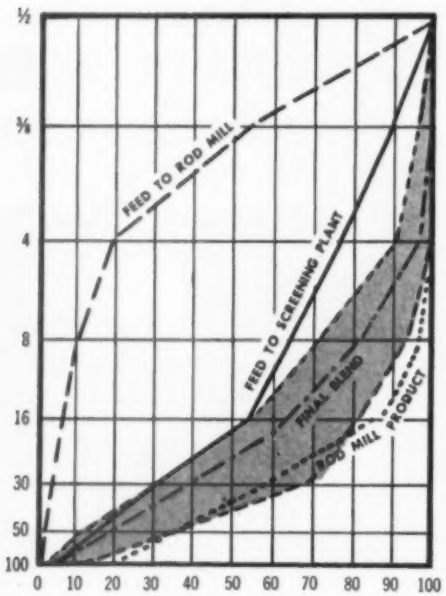
LUBRICATING ENGINEERS

CLEVELAND 4, OHIO, U.S.A. PHONE: VULCAN 3-7272

Enter 173 on card, page 167

KENNEDY ROD MILLS produce

Owners and operators are unanimously enthusiastic over the performance of KENNEDY Rod Mills in the manufacture of sand. The simplicity of the circuit, the ease and low cost of upkeep and the ability of the KENNEDY Rod Mill to produce large tonnages of sand which meets the most rigid specifications are among the important qualities which make KENNEDY Mills outstanding in this operation.



This screen analysis, made during a production run of a KENNEDY 4 x 10 Rod Mill circuit, shows how effectively the final blend meets specifications.

Consult KENNEDY *for full information on the production of sand with the* KENNEDY *Rod Mill.*

Primary & Secondary Gyratory Crushers • Jaw Crushers • Roll Crushers • Impact Breakers • Hammer Mills • Rod & Ball Mills • Kilns • Dryers • Screens

specification sand at less cost

◀ **Dan Grow, Plant Manager, Refractory Sand Co., Andreas, Pa.**

"We are called upon to make unusual specification sands by the various refractory companies. Without our Kennedy Rod Mills this would be an impossibility. For versatility and reliability you can't beat a Kennedy Rod Mill."

John H. Mowery, ▶ Plant Manager, Central Builders Supply Co., Sunbury, Pa.

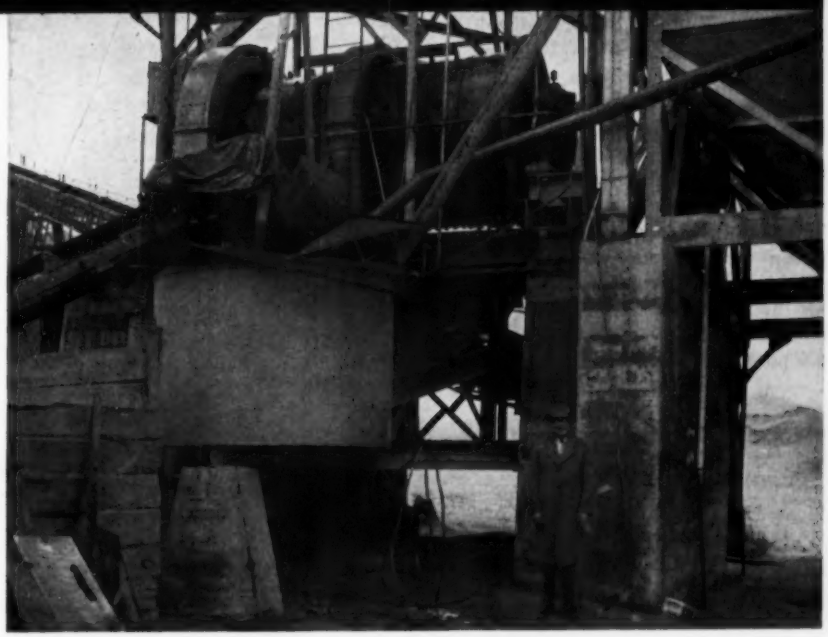
"We are constantly amazed at the high capacity our Kennedy Rod Mill gives us at the exact gradation we want."

◀ **Neal McMullen, President of Sheesley Minerals, Inc., Kunkletown, Pa.**

"We are one of the very few companies in our area capable of making sand to the rigid State specifications. Our Kennedy Rod Mill is, in large measure, responsible for this ability to produce and hold gradation. We investigated thoroughly before buying and are now certain it pays to own the best."

Dr. L. T. Hempt, ▶ Hempt Bros., Camp Hill, Pa.

"We have tried other methods of manufacturing sand, but experience has proved to us that processing in a Kennedy Rod Mill is the only economical way to do it. Kennedy Products are good and Kennedy Service is even better."



KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

• Mechanical and Pneumatic Conveyors • Complete Crushing, Lime, Cement & Carbon Paste Plants • KENNEDY Research & Testing Service.

The Alloy Rods Company has organized a Hard Surfacing Division to be operated as a separate sales group for the company. EINAR IVERSON of the company's Chicago office has been named manager of the division and will headquarter at the firm's main offices in York, Pa.

Mr. Iverson is experienced as a welding engineer, and has been a field representative for Alloy Rods Company since 1956. His former territory in the Chicago area will be taken over by Robert Mann, a field representative with the company.

Products to be included in the new division activities are *Wear-Arc* hard surfacing electrodes, *Wear-O-Matic* wire feed unit, and *Wear-O-Matic* wires and *Tool-Arc* electrodes for tool and die welding.

E. KENNETH SANDBACH has been named manager, foreign sales department, Koppers' Engineering and Construction Division, Koppers Company, Inc., Pittsburgh, Pa. His headquarters will be in that city. Prior to accepting his present position with Koppers, Mr. Sandbach was vice-president of the Williams Brothers Company, Tulsa, Okla.

Appointment of LEONARD H. SENCE as assistant to E. F. GREIWE, manager of the Allis-Chalmers Manufacturing Company centrifugal pump department at Norwood (Ohio) Works has been announced. Mr. Sence had been associated with Allis-Chalmers West Allis centrifugal pump department since 1955.

DAVID A. PEASE has been appointed by Hyster Company as manager of the firm's news bureau, located at the home office in Portland, Oreg. Prior to joining Hyster Company Mr. Pease was research editor of the Northwest Public Power Association, a trade association.

THOMAS G. PATTERSON JR., purchasing agent of the Denver based Gates Rubber Company, has been named director of purchases and traffic. In his 17th year with Gates, Mr. Paterson started as an expediter in purchasing.

GLEN D. BRIGHT has been appointed a sales engineer assigned to operate out of the Chicago district office of Fuller Company. He will handle sales and service of air compressors and vacuum pumps in the midwestern states.

G. D. Bright

A. I. Edwards

ALBERT I. EDWARDS has been assigned to Allis-Chalmers processing machinery department as a special representative. He joined Allis-Chalmers in 1946 and for three years was associated with the pyro-processing section of the processing machinery department. In 1949 he became a specialist in the Mid-Atlantic region for the department.

Appointment of WEY KENNY as general accounting manager for Massey-Ferguson Industrial Division, Wichita, Kans., has been announced. Mr. Kenny formerly was chief accountant for Frontier Chemical Company, Wichita, becoming regional internal auditor for Vulcan Materials Co., Birmingham, Ala., when Frontier merged with that company.

G. E. IRVING has been appointed to the new position of assistant general manager, product departments, Lachine Works, Canadian Allis-Chalmers Limited. A. G. SQUIBB has succeeded Mr. Irving as manager of sales, mining and milling machinery.

OTTO R. BROWN has been named western regional manager of the explosives and mining chemicals department, American Cyanamid Company. Mr. Brown has been with Cyanamid since 1935, serving the company in many engineering capacities.

Leeds & Northrup Company, Philadelphia, Pa., announces the following changes in its sales division: EDWIN A. YEO JR. has been promoted from district manager in Chicago to the new post of assistant manager in the sales division. WILLARD H. NEU moves from district manager at Pittsburgh to district manager at Chicago. MANLEY S. NOLEN transfers from Cincinnati district manager to Pittsburgh district manager.

CHARLES W. SULLIVAN, branch manager of the Columbus office, advances to Cincinnati district manager. JOHN C. SCOTT JR. is promoted from field engineer at Columbus to branch manager there. JOHN C. EMERLINE is promoted from branch manager at Baltimore to St. Louis district manager, the position fromerly held by JOHN F. SNEATH, who becomes technical assistant, field inquiries, in Philadelphia. GEORGE J. DEMOS is promoted from resident engineer at Albany to branch manager at Baltimore. PHILIP H. KUHL advances from sales engineer at Cleveland to resident engineer at Albany.

Appointment of Cook Brothers Truck & Equipment Company, Oakland, Calif., as distributor for the complete Koehring construction equipment line in northern California and northwestern Nevada has been announced.

Cook Bros., who have sold and serviced products of the Parsons, C. S. Johnson, and Ko-Cal divisions for some time, now also are adding the Koehring, Buffalo-Springfield, Kwik-Mix and KA-MO lines.

Brook Motor Corporation, Chicago, Ill., has opened a branch office in New York, N. Y., with JOHN J. O'DONNELL as branch manager. The New York area warehouse will continue to be at Jersey City, N. J. Brook Motor Corp. builds heavy duty alternating current motors from 1 to 600 hp. for all industrial purposes.

Appointment of DAVID B. EDEN to the newly created position of director of distributor sales for SKF Industries, Inc., has been announced.

WESTERN PRECIPITATION'S

NEW THERM-O-FLEX COLLECTOR

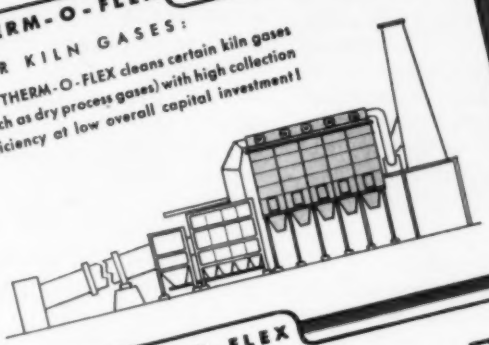
CLEANS GASES TO 550°F

with VIRTUALLY 100% COLLECTION!

THERM-O-FLEX

FOR KILN GASES:

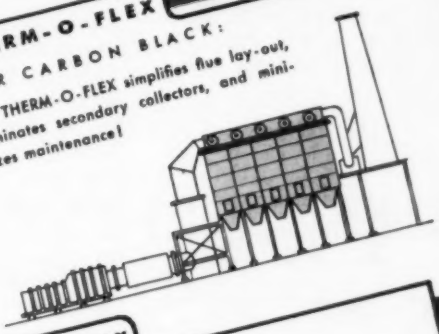
The THERM-O-FLEX cleans certain kiln gases (such as dry process gases) with high collection efficiency at low overall capital investment!



THERM-O-FLEX

FOR CARBON BLACK:

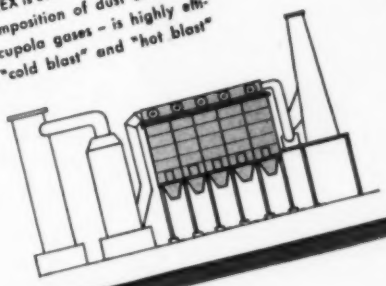
The THERM-O-FLEX simplifies flue lay-out, eliminates secondary collectors, and minimizes maintenance!



THERM-O-FLEX

FOR CUPOLA GASES:

The THERM-O-FLEX is unaffected by the varying chemical composition of dust and fume particles from cupola gases – is highly efficient on both "cold blast" and "hot blast" processes!



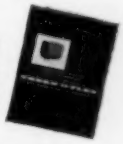
Western-Precipitation brings another important new advancement to the gas cleaning field — the THERM-O-FLEX Collector — a filter type of unit with many advantages over conventional filter equipment...

- The THERM-O-FLEX features glass silicone treated filter tubes that efficiently handle gases as hot as 550° F!
- The THERM-O-FLEX tubes are cleaned *automatically* by intermittent collapsing (not by destructive shaking). This assures uniformly low pressure drop combined with long filter life!
- The THERM-O-FLEX has *no moving parts* — nothing to require frequent servicing or replacement!

RESULT — highest collection efficiency combined with lower cost, less maintenance and uniformly low pressure drop on a wide range of applications, a few of which are shown at left.

Let Our Experienced Engineers study your dust or fume collection problem — *large or small* — and show exactly how THERM-O-FLEX gives new standards of performance at low installation costs. No obligation, of course!

HELPFUL NEW BULLETIN describes multiple Therm-O-Flex savings, outlines applications, technical data. *Ask for Bulletin #F105!*



COTTRELL Electrical Precipitators
MULTICLONE Mechanical Collectors
CMP Combination Units
DUALAIRE Jet-Cleaned Filters
THERM-O-FLEX Hi-Temp Filters
TURBULAIRE-DOYLE Scrubbers
HOLO-FLITE Processors
HI-TURBIANT Heaters

WESTERN
PRECIPITATION
CORPORATION

Engineers and Constructors of Equipment for Collection of Suspended Material from Gases . . . and Equipment for the Process Industries

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Representatives in all principal cities

Precipitation Company of Canada Ltd., 8285 Mountain Sights Avenue, Montreal 9

ROY E. GOODWILL JR. has been appointed manager, general products division sales, central region, for Allis-Chalmers Manufacturing Company, Milwaukee, Wis. Mr. Goodwill joined the company in 1956. His headquarters will be in the regional office in Cleveland, Ohio.

WILLIAM R. CARLYON has been appointed manager, general industrial sales, Detroit district. He joined Allis-Chalmers in 1949.

Promotion of WILLIAM A. MULLIN to manager of camelback and repair material sales for The General Tire & Rubber Company, Arkon, Ohio, has been announced. He succeeds FLOYD A. YOCKE, who is now Akron division manager.

Baker Equipment Engineering Company, Inc., is now a distributor for Worthington Corporation, Harrison, N. J. Baker Equipment's territory includes the State of West Virginia, except Marshall, Brooke, Ohio, and Hancock counties.

Lakeside Truck Body Co., Turlock, California, is a new distributor for the *New Leader* line of Highway Equipment Company, Cedar Rapids, Iowa, serving the state of California north of and including the Counties of Monterey, Kings, Tulare, and Inyo.

Caterpillar Tractor Company, Peoria, Ill., has announced that it will consolidate its domestic sales, parts, service and treasury operations in January, 1960. Nineteen men of the Company's northwest and southwest divisions will occupy offices at Peoria. They currently are headquartered in San Francisco. All northwest and southwest division field and district representatives will continue to work in their present locations.

DR. I. RICHARD GREGOR has been appointed director of manufacturing for foreign operations by the J. I. Case Company, Racine, Wis. He has held executive positions in the United States and abroad.

Recent changes in its sales organization have been reported by Raymond Bag Corporation, Middletown, Ohio, a division of Albemarle Paper Manufacturing Company.

R. G. ROBERTS JR. has been appointed to the newly created position of assistant sales manager. Formerly connected with the Chicago sales office, he will now be located in Middletown.

T. H. BACON, formerly eastern district sales manager, has been named eastern regional sales manager, and will continue to be located in New York City.

R. J. STEVENS, formerly midwestern district sales manager, is now western regional sales manager, and will continue to be located in Chicago. J. M. GREENE of Raymond's Louisville office has been appointed central district sales manager.

Two new members have been elected to the board of directors of American Hoist & Derrick Company, St. Paul, Minn. They are PORTER THOMPSON, a partner in the law firm of Lennell, Brown, Perkins, Thompson & Hinkley, of Portland, Maine; and DONALD R. BERNER, president of Hetherington & Berner, Inc., Indianapolis, Ind., the new wholly owned subsidiary of American Hoist.

Take Your Pick
OF THESE BROOK A.C. MOTORS

THE Open Drip Proof NEMA Rerate Motor occupies less space—weighs 12 to 15% less than the Open Drip Proof Motor in the old frame. This is no case of "Riding horse versus draft horse"—both motors have equal stamina. Some prefer the old frames, especially where space is no factor. Brook warehouses coast-to-coast carry both types in stock. You can't find a better motor at any price, yet Brook Motors cost substantially less, because of volume production, modern techniques, world-wide distribution and a realistic pricing policy. Brook Motors available from 1 to 600 H.P. All standard enclosures. Write for literature and name of your Brook Dealer.

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In Canada: Brook Electric Motors of Canada Ltd., 250 University Ave., Toronto, Ont.

SINCE 1904 BROOK MOTOR CORPORATION

Enter 178 on card, page 167

Legal Decisions

(Continued from page 152)

In *Maufrais v. State*, 180 S. W. (2d) 144, the higher court held that the line dividing the property of riparian owners, when avulsion occurs, remains according to the former boundaries, and not according to the boundaries created by the avulsion. Hence, where excavations are made by riparian owners, and a navigable river cuts through its banks and establishes a new bed in addition to the old bed, the title to the island formed in a navigable stream belongs to the state. But where an island in a navigable river is formed by cutting off a part of a riparian owner's land, the state owns only that part of land used by the river for its bed, and the title to the remainder of the land remains in the riparian owner.

LORAIN MOTO-LOADER MOVES 1500 TONS DAILY . . . SPEEDS PIT-TO-PLANT PRODUCTION LINE

Giordano Brothers of Toronto, Ontario, bought their Lorain Moto-Loader at a demonstration. "We saw it in action and were sold on the spot," says a company spokesman. "It has the speed and stability we need for our fast operation."

At their Toronto pit, the husky 2-yd. Moto-Loader handles mulch for a hot asphalt mix plant. It averages 1500 tons in a 14 hour day. Where fast loading cycles are a must, the Lorain Moto-Loader has all the features for consistently high output.

Lorain's balanced design makes the difference when the going's tough. **Power balance** for the right degree of power, no wheel spinning, no wasted horsepower. **Weight balance** with low center of gravity, no bounce or teeter with the heaviest loads. **Control balance** lets operator combine operations for faster, smoother loading cycles.

Ask your Lorain distributor about the 2-yard ML-157 (7000 lb. carrying capacity), or the 1¾ yard Lorain ML-153 (6000 lb. carrying capacity). Either one will build your profits.

One-foot travel control speeds loading cycles. By pivoting one foot between two adjacent pedals, operator moves Moto-Loader forward or backward. Depressing pedals further provides instant acceleration. Both hands are free for steering and other operations. Power booster steering assures maximum maneuverability.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

LORAIN®

ON THE MOVE

PLANTS in Lorain, Elyria and Bucyrus, Ohio.

PRODUCTS—Power shovels, cranes, draglines, clamshells, and hoes on crawler mountings from ⅜- to 2½-yard capacity · Cranes from 7 to 80 tons . . . on crawlers, and as rubber-tire Moto-Cranes, and Self-Propelled Cranes · Rubber tire front-end Moto-Loaders in 1¾- and 2-yard models.

OUTLETS—Lorain products sold and serviced by 249 distributor outlets throughout the world.

Hendrick Manufacturing Company, Carbondale, Pa., has appointed three new sales offices. Filters Incorporated, Boston, Mass., will sell the complete line of Hendrick products in the New England area. The state of Michigan will be served by Frank W. Lynch & Company, with main offices at Southfield, Mich.

Northern New York State, including the sales territory north of Sullivan, Ulster, and Dutchess counties, is to be represented by HAROLD SNEDEKER, with headquarters in Carbondale, Pa. ROBERT F. VANDENBURG, formerly northern New York sales representative, has been appointed special field service engineer for aggregates products.

Appointment of JOHN O. CUSHING as district manager, Atlanta, Ga., has been announced by SKF Industries, Inc., Philadelphia, Pa. Mr. Cushing, who will direct the sales and engineering services of the company in its Atlanta district, joined SKF in 1951 as a sales trainee. Prior to his new assignment, he was a field engineer serving the Cincinnati district.

Heil Northeast Products Corporation, South Burlington, Vt., is a new distributor for the *New Leader* line of Highway Equipment Company, Cedar Rapids, Iowa. The new distributor will serve the state of Vermont with the exception of Bennington County, and will also serve Clinton, Franklin, and Essex counties in New York.

JOHN N. LEWIS has been named manager of the Detroit district sales office of The Patterson Foundry and Machine Company, East Liverpool, Ohio. Prior to joining Patterson, he was associated for a number of years with Boydell Brothers in Detroit. He replaces A. T. JACOBSON, who recently was named general sales manager of the company.

ANDREW J. COX has been appointed administrative assistant to the general manager of the construction machinery section of Chain Belt Company, Milwaukee, Wis.

New district sales managers for mechanical goods were recently named at two branches of the United States Rubber Company. RALPH W. STAMBAUGH, district sales manager at the company's Pittsburgh branch, was named eastern regional conveyor belt engineer. He has been with U. S. Rubber since 1942.

DELWOOD C. LEE, formerly district sales manager at the New Orleans branch, was appointed to fill Mr. Stambaugh's post at Pittsburgh. Mr. Lee joined U. S. Rubber in 1950.

JOHN M. MCCARTHY, an assistant district sales manager at the company's Los Angeles branch, was named to Mr. Lee's former New Orleans position. Mr. McCarthy also joined U. S. Rubber in 1950.

WILLIAM L. PETERSON has been appointed manager of the Philadelphia branch of the White Truck Division of the White Motor Company. Mr. Peterson, who has been serving as White's director of sales engineering for the last year, will be in charge of sales, parts, and service for White and Autocar trucks in the Philadelphia area.

For over 25 years the Chase Bag Company executive offices have been in the Commerce Building at 155 East 44th St., New York, N. Y. In October, its entire headquarters staff moved to a recently-completed 22 story office building at 355 Lexington Avenue in New York. Chase maintains 14 plants and 32 sales offices throughout the country.

KINGDON B. DIETZ has been appointed New York district sales manager of The Colorado Fuel and Iron Corporation. Mr. Dietz had been the assistant sales manager of the New York district since January, 1958. He joined CF&I in 1954.

REED W. CAMPBELL has been named chief engineer of The Patterson Foundry and Machine Company, East Liverpool, Ohio. Previously he had been product manager in charge of the company's reaction vessels and processing systems.

The Timken Roller Bearing Company, Canton, Ohio, has acquired the assets of British Timken Limited. Appointed liquidator of British Timken assets is the former chairman of the board and managing director of that company, Sir John Pascoe. The new overseas organization will be termed "British Timken, Division of The Timken Roller Bearing Company." Management of operations of the new organization will remain in the hands of British personnel with Sir John as chairman of the newly created board of directors of the British Division and S. F. Bennett as managing director. Sir John and H. E. Markley, executive vice-president of Timken, were recently elected directors of the parent company.

The H. K. Porter Company, Inc., Pittsburgh, Pa., has acquired the Hill Transformer Corporation, San Carlos, Calif. Hill will thus become the sixth Porter manufacturing facility in the eleven western states, and will bring to a total of 52 the number of plants operated by Porter in the United States, Canada, and Mexico.

As a Porter operation, Hill Transformer will continue to manufacture its line of dry type and liquid immersed distribution transformers and power transformers for utility and industrial applications. MAX HILL, founder and president of Hill Transformer Corporation, will contine to manage the San Carlos operation.

JOHN QUINCY SHUNK, a pioneer in the manufacture of blades and cutting edges for earth-moving equipment, died recently in Bucyrus, Ohio. Born at the close of the Civil War, Mr. Shunk was 93 at his death. He served the Shunk Manufacturing Company for many years as president and general manager until his retirement in 1945.

Mr. Shunk was the youngest of ten children of Adam Shunk, founder of the company that bears his name. The combined lifespans of Mr. Shunk and his father total 189 years. The elder Shunk was born in 1797 during George Washington's administration and died in 1893 at the age of 96.

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Raw materials available?

Market available?

Location correct?

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Right time to build?

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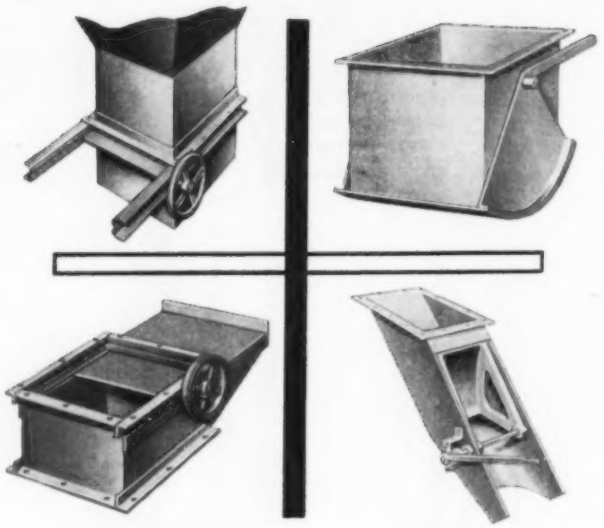
Ehrsam otters a complete selection of engineered gates for all industry. Regardless of what type of material is handled, these rugged and dependable gates will insure a controlled discharge. Ehrsam gates will provide efficiency, dependability and durability; the answer to your bulk handling problems. All styles and models are compact, easy to install and operate and require minimum maintenance, thereby reducing operating time and cost.

Why not write today for your copy of the new Ehrsam Gate Catalog No. 7A?



The J. B. Ehrsam & Sons Mfg. Co.

Enterprise, Kansas

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IMPROVED
PERFORMANCE
SPRAYING SYSTEMS
SPRAY
NOZZLES
• Choose from the industry's most complete selection of capacities and types to obtain the nozzles that best fit your job. Improve spraying efficiency and lower your spraying costs. Wide choice of nozzles for washing, dust control operations and concrete curing.
Write for Catalog 24
WRITE FOR Catalog 24... forty-eight pages with complete data on nozzle types, capacities and performance.
SPRAYING SYSTEMS CO.
3224 RANDOLPH ST., BELLWOOD, ILL.

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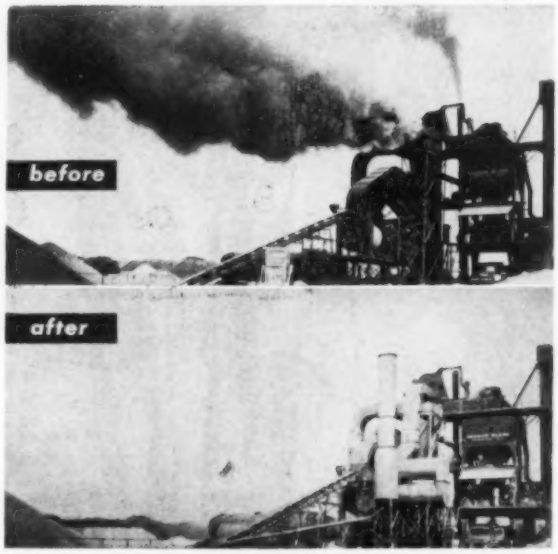
George stopped it . . .

(and saved money, too)



with a Bollard Dust Washer!

"Tried 2 other makes of collectors (top), but only Bollard '3-way action' (bottom) killed our dust", says George Slade, owner of this asphalt plant at Bridgeton, N. J. Fits any make plant. Ends complaints. Lowest price. Get the facts—write, or call collect, today!

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THE COLONIAL IRON WORKS CO.
17615 St. Clair Ave., Cleveland 10, O. KEnmore 1-2300
Complete Asphalt Plants and Components since 1916.

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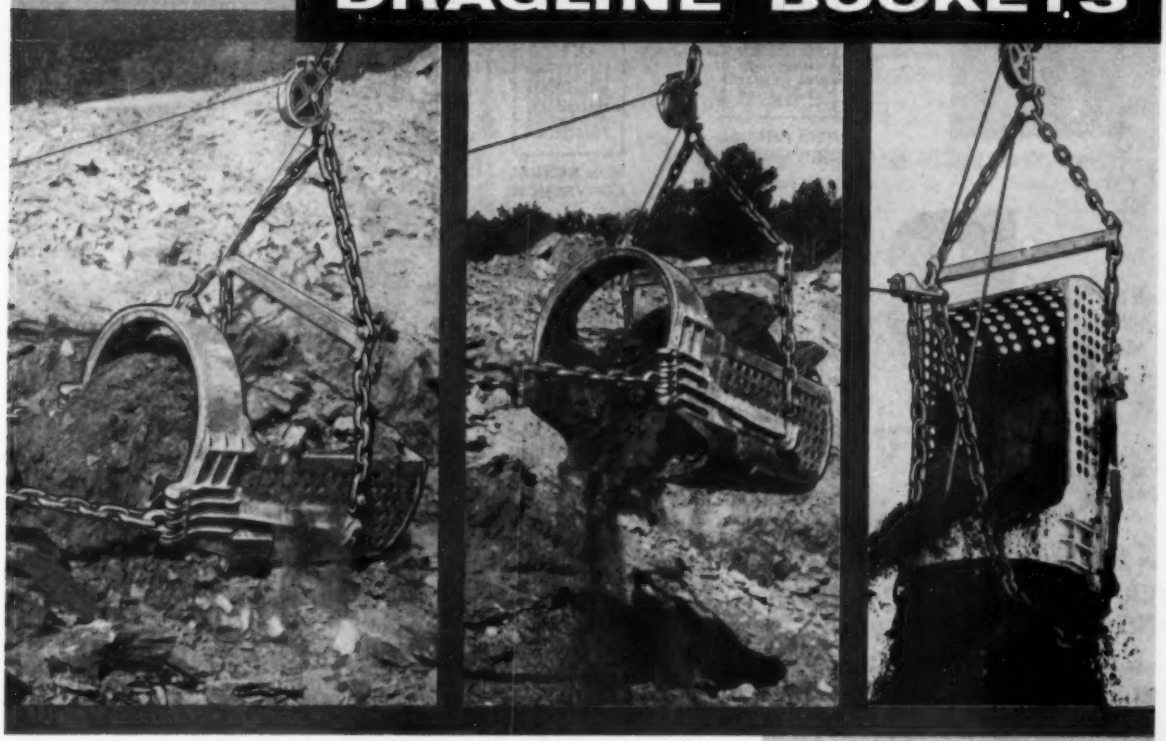
Fill faster...
Handle easier...
Dump cleaner...

3 types for every digging purpose

HENDRIX
DRAGLINE BUCKETS



¼ to 40 Cubic Yards
Perforated or Solid

Hendrix Lightweight DRAGLINE BUCKETS

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

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NATIONAL SAND AND GRAVEL ASSOCIATION
44th ANNUAL CONVENTION

NATIONAL READY MIXED CONCRETE ASSOCIATION
NRMCA
30th ANNUAL CONVENTION

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CHICAGO • FEBRUARY 15-19, 1960

- **ONE SHOW AT TWO LOCATIONS:** Conrad Hilton and the Coliseum. (Free, fast 2-way bus service between.)
- **ACRES OF NEW IDEAS** to benefit your business — the two years' progress of your industry.
- **SHOW DAYS:** Monday, Tuesday, Wednesday, Thursday morning.
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- **GIVES YOU 2** full Show days free from Convention meetings.
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for fast, on-the-spot

CONVEYOR BELT REPAIRS

Exclusive cold self-vulcanizing material

- No heat, no equipment needed
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- Ever-last bond won't melt, unaffected by moisture, petroleum, most acids
- Eliminates danger of heat damage to belt during repairs
- PANG cuts repair costs, adds years to belt life

Write for prices and details:

PANG
AUTOMATIC VULCANIZERS CORP.
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DREDGE SLEEVE CLAMPS

Sturdy • Practical • Dependable • Economical

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U.S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply... positive in action. Write for illustrated folder, today.

THE BLACK BROTHERS CO., INC.
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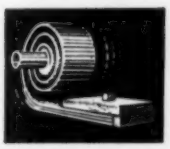
RELIABILITY

In remote locations, you'll really appreciate the day-in, day-out top performance of Overstrom Vibrating Screens.

"How to Estimate Screen Area Requirements" — part of the useful data in our new 8-page Catalog. (Write Dept. PQ-6 for your copy.)



OVERSTROM & SONS, INC.
2213 WEST MISSION ROAD • ALHAMBRA, CALIF.

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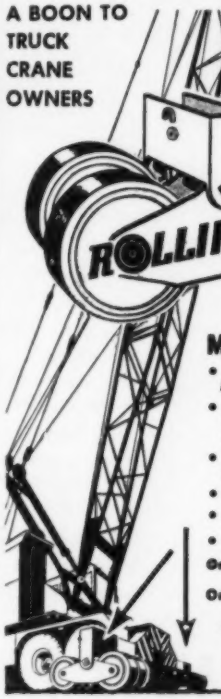
A BOON TO TRUCK CRANE OWNERS

INCREASE YOUR MOVING CAPACITY in both Short and Long Stick operations UP TO 50% with



ROLLING OUTRIGGERS
TRADE MARK PATENT PENDING

that FIT
ALL MAKES AND
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- ALLOW NEAR-CAPACITY LOADS TO BE MOVED OVER LEVEL AND RUGGED TERRAIN
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- TANDEM, PIVOTAL ACTION WHEEL ASSEMBLY
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One Pair Single Tandem Units, Weight approx. 1800 lbs.
One Pair Double Tandem Units, Weight approx. 2800 lbs.

"ROLLING OUTRIGGERS" INSURE MOBILITY, SAFETY AND INCREASED PROFITS

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WRITE FOR NAME OF "ROLLING OUTRIGGERS" DEALER IN YOUR AREA

SOME EXCELLENT DEALERSHIPS ARE STILL AVAILABLE

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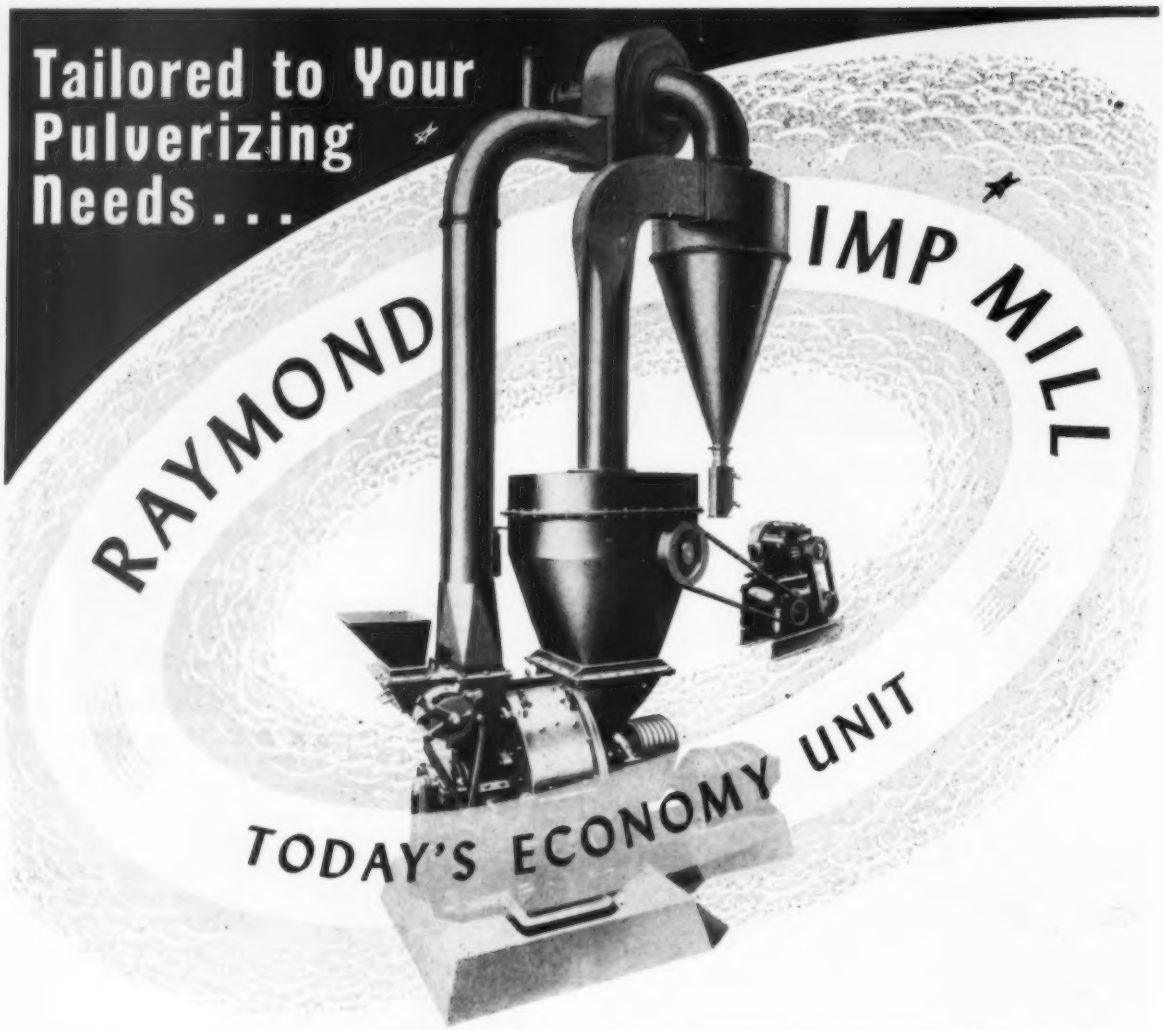
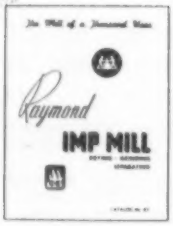
Tailored to Your Pulverizing Needs . . .





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THIS compact grinding unit is one of the most versatile and economical mills in the Raymond line for medium size plants.

It occupies small floor area . . . fits readily into any plant lay-out . . . delivers up to several tons per hour . . . handles a great variety of non-metallic minerals, chemicals and specialty products.

It is equipped with the *whizzer air separator* which gives efficient fineness control . . . increases output of fine material, assures consistent uniformity of product . . . all with the utmost economy of operation and maintenance.

The Imp Mill may be furnished with *flash drying accessories* for removing moisture while pulverizing, such as in drying and grinding ball clays direct from the pits, or in calcining gypsum for making wallboard.

If you have an unusual product that is difficult to process . . . the Imp Mill may be the answer to your problem. It provides a clean, dust-free, automatic system that cuts costs.

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Combustion Engineering-Superheater Ltd., Montreal, Canada

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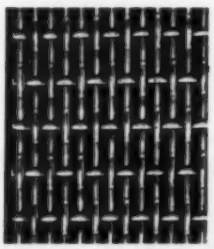
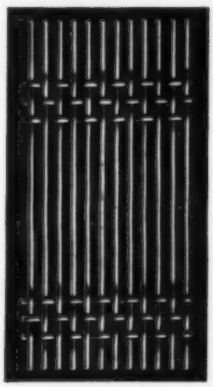


For maximum through capacity, CF&I Space Screens with rectangular openings are recommended. The high percentage of open area provides considerable freedom from blinding or clogging.



For maximum freedom from blinding or clogging, CF&I Long Slot Space Screens are the most efficient construction. Because of the open area and intense vibration of wires on the long sides of the openings, material can not cling or build up.

* * *

Whatever your screening operation, our engineers will be glad to help you select the optimum screen for your needs.

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SPACE SCREENS

for less downtime . . . long screen life . . . accurate screening

Symbol for the dependability of all CF&I steel products, the giant steelman can be relied on for tough, precision space screens.

CF&I Space Screens are ideal for rugged screening operations because they are made from quality steel, and are available in a wide selection of types, weaves, crimps and edge preparations. They give long service and, consequently, fewer work stoppages and greater tonnage output for your screen dollars. CF&I Space Screens are tightly woven on hydraulic looms to retain uniform spacing and openings, thus assuring accuracy under the most demanding screening conditions.

When you need a space screen that will stand up under the most severe abrasion and vibration, specify either Super Tempered Screens, made from a special oil-quenched wire, or Wisscoloy Screens, made from a special alloy steel wire.

For engineering assistance in choosing the right space screen for your operation, contact our nearest sales office.

CF&I SPACE SCREENS

THE COLORADO FUEL AND IRON CORPORATION

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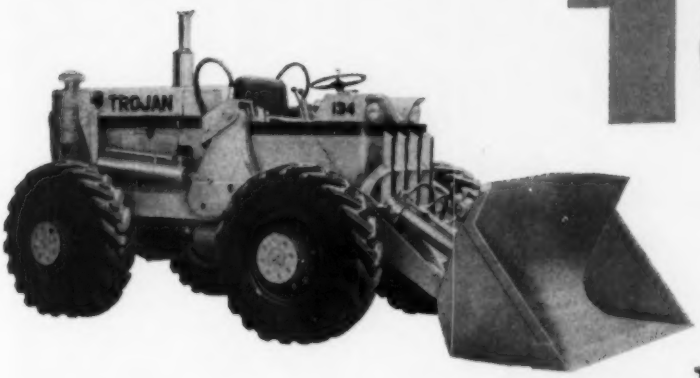

MODEL 134
8,000 LB. CAPACITY

MODEL 164
10,000 LB. CAPACITY

TROJAN makes what it takes for any job!

Now you can bid any size job—secure in the knowledge that this complete Trojan line fits any and all applications. With the introduction of the 134 and 164, both one-machine owners and fleet operators alike may choose from a full working range . . . 1 to 4 cubic yards in lifting capacities from 5,000 to 24,000 lbs. . . . making available to every operator a model precisely matched to his needs . . . Add up the many Trojan benefits and features, you will then see why any one of these models could mean extra profits from the very first working day . . . Put yourself ahead—ask your distributor to demonstrate the Trojan model of your choice.

TROJAN 134

This 1⅓ yard machine, with an 8,000 lb. lifting capacity, has an 8′8″ dump height, 2′5″ forward reach and gas or diesel power.

TROJAN 164

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TROJAN DIVISION
BATAVIA, NEW YORK • SAN LEANDRO, CALIFORNIA

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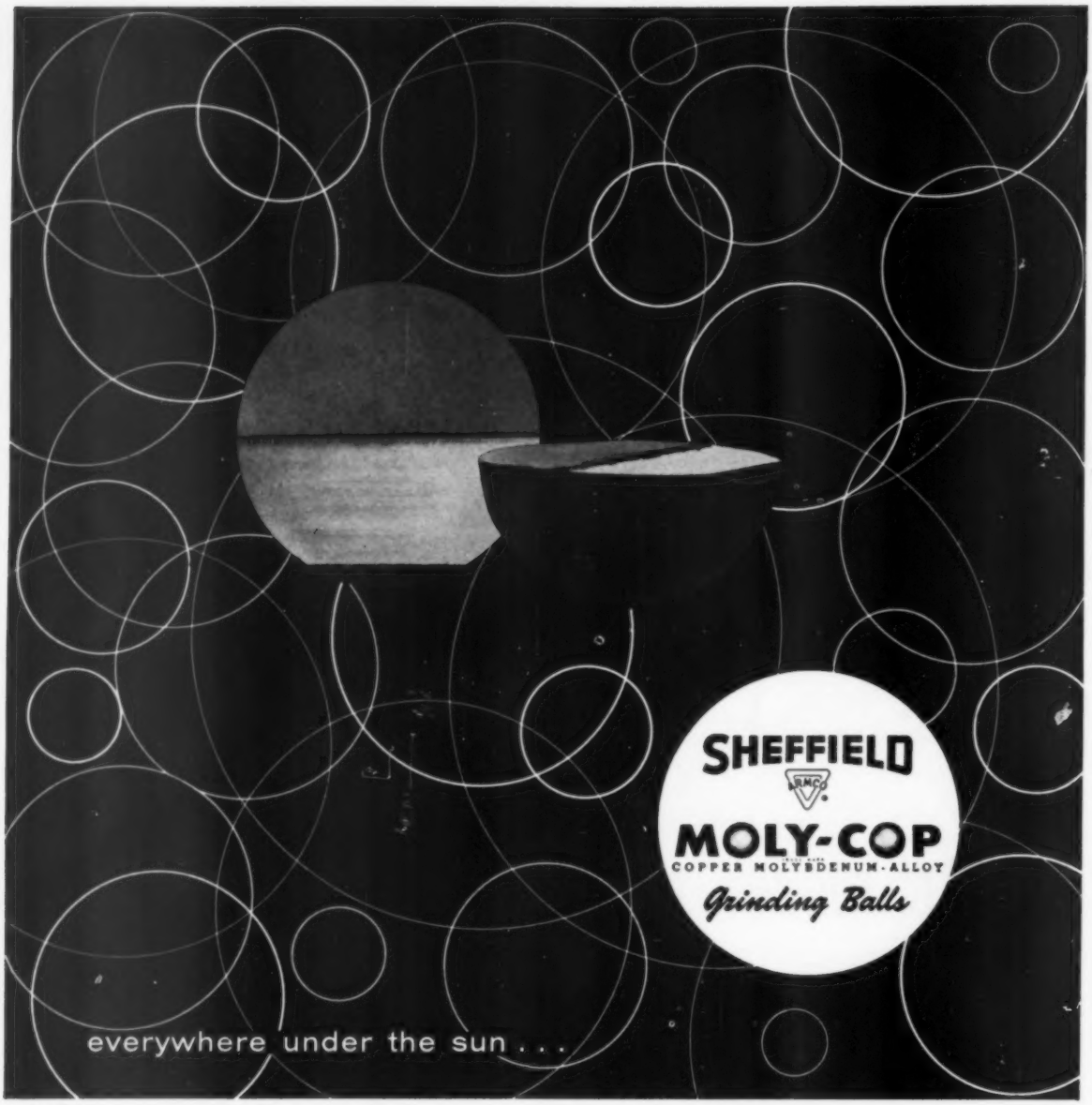
TRACTOR SHOVELS
YALE & TOWNE



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New steels are born at Armco

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For Crushed Stone Plant and Blacktop Plant. Write for full information to

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Age: 25 to 33 years

Education: Graduate Engineer

Experience: 2 to 5 years in production, either staff or operating side. Experience should be in industry connected with moving of heavy materials either in processing or mining.

Salary: Commensurate with ability and experience in range of $7,500 to $10,000. Send resume to:

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COMPRESSORS: 750 CFM West. stat'y. 600 CFM IR Gyroflo. 10 Joy 75 CFM. 2 400 IR PRE2.
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8'x48" Hardinge. Yuba 7x35' SCRUBBERS.
MILLS: Raymond 5047 Roll. Dixie 2424 non-clog. 3650 std. Stedman 2018. CR3 Hammer.
CONVEYORS: 18"x30', 18"x178', 24"x100', 30"x83', 36"x250' Troughing. 24" & 36" Roller.
ROLLERS: Huber 5-8 ton tandem. Hercules 10 ton.
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50' Boom—rudimatic or similar tagline assembly, drum lagging, and other parts to convert 955A—P & H #15002 from shovel to crane. Would consider trading shovel front for crane boom assembly.

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Universal TD24 Gravelmaster, 1024 RB jaw, 24" Twin Roll, 3x10 3½ deck screen Roto-Vator, excellent plant, 200 TPH capacity.

Gruendler Portable Plant, 3XB mill, apron feeder, 3x6 screen, Cat D-8800 power, $8500.

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Rex 6 Yd. Adjusta-Wate Mixer, Open End, flush tank, Chrysler engine on International LF192 Tandem Truck. Ready to go—new 1953.

Rex 5 Yd. Mixer, Chrysler engine, flush tank, new engine on 1955 GMC 620 tandem—air—perfect.

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7-W Bucyrus Erie Diesel Drag, 140', 7 yd.
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2400 Lima Dragline, 130', 5 yd.
4500 Manitowoc Drag, 120', 5 yd.
120-B Bucyrus Erie Elec. Drag, 115', 5 yd.
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120-B Bucyrus Erie 4 Yd. Elec. Shovel
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1201 Lima 3½ Yd. Standard Shovel
111-M Marion Standard & H.L. Shovels
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Large selection of smaller Shovels & Draglines
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35 Ton Davenport 0-4-0 Mechanical Drive, Serial No. 2316. LeRoi RXIV 8 Cylinder Engine. Excellent Cond.

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1—Caterpillar Diesel Electric Generator Set, 200 KW, 440V—3 phase, 60 cycle. Powered by Caterpillar Model 375 diesel engine, complete with floor type panel board with standard instruments and air starter.

Generator Serial No. 55C8499
Engine Serial No. 18B158
Less than 2800 hours operation
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Dings High Intensity Electro-Magnetic Pulleys—one 36" Dia. for 30" belt and one 42" Dia. for 36" belt, both with standard accessories.

Universal Simplicity 4' x 12' single deck model "DE" heavy duty scalping screen with perforated 8" square opening plate deck, 1" x 2" riding rails, motor mount and 20 H.P. V-belt drive (less motor).

Two 4" Dia. x 5'6" Stroke Hydraulic cylinders and two 4" Dia. x 7'5" Stroke Hydraulic cylinders.

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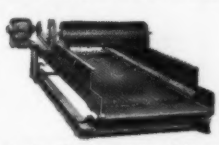
Complete Pre-Fab sections of 8" Jones & Laughlin Jr. I Beam Frame Conveyors quickly and easily joined together on the job. These beams are rolled with .20% Copper Content. Atmospheric exposure tests disclose that Junior Beams with .20% Copper have as much as four times the resistance to corrosion as non-copper steels. Braced with structural angle, welded to frame for maximum rigidity. Equipped with 5" roll diameter idlers and return rolls, 20" diameter head pulley and 16" diameter tail pulley, mounted on 2¼" or 2 7/16" diameter shaft.

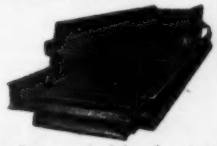
We take our loss on our stock of short length belting. You can save as much as 50% on BONDED CONVEYOR SPECIALS, with conveyor belting in two pieces. Belt is new 4-ply, 28 oz. duck, ⅛" top rubber cover x 1/32" bottom cover Major grade belt and is Fresh Stock made by leading manufacturers. **WRITE FOR BULLETIN #1138.**

Bonded troughing idler conveyors also available in Truss Frame Construction. **WRITE FOR BULLETIN #1189 AND PRICES.**

Belt Width	Length of Conveyor	List Price	Sale Price	Add or Deduct Per Foot
14"	25'	$1397	$ 738	$16.84
14"	50'	2222	1159	
14"	85'	3377	1748	
16"	20'	1262	667	18.04
16"	45'	2137	1118	
16"	60'	2662	1388	
16"	90'	3712	1930	
18"	25'	1477	787	19.34
18"	45'	2217	1182	
18"	70'	3142	1663	
18"	85'	3697	1952	
18"	100'	4252	2240	
18"	130'	5362	2817	
20"	25'	1517	835	20.37
20"	60'	2882	1548	
20"	75'	3467	1854	
20"	90'	4052	2159	
24"	25'	1590	898	21.78
24"	45'	2430	1334	
24"	70'	3480	1878	
24"	100'	4740	2532	
24"	120'	5580	2967	
24"	150'	6840	3621	
30"	50'	2911	1617	24.75
30"	70'	3871	2112	
30"	90'	4831	2607	
36"	25'	1818	1118	27.95
36"	45'	2858	1677	
36"	60'	3638	2096	
36"	100'	5718	3214	

BONDED ® GENERAL DUTY AND HEAVY DUTY VIBRATING SCREENS





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PERFECT BALANCE AND SHARP ACTION. Eccentric weight mechanism, spring mounted. 1 to 3 decks, 2' x 4' to 3' x 8'. **WRITE FOR "SEVEN SECRETS OF SUCCESSFUL SCREENING" IN BULLETIN NO. 1086.**

Model Number	Screening Area	No. of Decks	Sale Price
124A	2'x4'	1	$ 443
224A	2'x4'	2	472
126A	2'x6'	1	472
226A	2'x6'	2	501
134A	3'x4'	1	504
234A	3'x4'	2	570
136A	3'x6'	1	581
236A	3'x6'	2	688
336A	3'x6'	3	958
138A	3'x8'	1	675
238A	3'x8'	2	815
338A	3'x8'	3	986

FACTORY BALANCED, CONTROLLED VIBRATION. Four bearing positive throw eccentric shaft; 3' x 6' to 5' x 14'. 1 to 5 decks. **WRITE FOR BULLETIN NO. 1087 AND 9 REASONS WHY BONDED IS YOUR BEST BUY.**

Model Number	Screening Area	No. of Decks	Sale Price
336B	3'x6'	3	$1620
436B	3'x6'	4	1685
138B	3'x8'	1	1310
238B	3'x8'	2	1620
338B	3'x8'	3	1735
248B	4'x8'	2	2310
348B	4'x8'	3	3440
2410B	4'x10'	2	3400
3410B	4'x10'	3	3550
2412B	4'x12'	2	3590
3412B	4'x12'	3	3970
4412B	4'x12'	4	5165

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MAJOR BRAND. 12# to 15# **AVERAGE FRICTION PULL.** 800# to 1000# **AVERAGE COVER TENSILE.** Heavy Duty, 4-ply, 28 oz. duck. ⅛" top rubber cover x 1/32" bottom rubber cover. High tensile strength. Tough cotton duck. Strong carcass and proper flexibility. For heavy boxes, bags and bulk materials. Troughs easily.

Width	Ply	List Price Per Foot	Sale Price Per Foot
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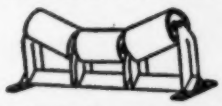
16"	4	4.24	3.09
18"	4	4.69	3.42
20"	4	5.17	3.95
24"	4	6.08	4.43
30"	4	7.47	5.42
36"	4	8.85	6.43

***All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.**

Other widths, piles, duck weights and cover thickness available at low prices.

BONDED® IDLERS & RETURN ROLLS SAVE 25% AND MORE



3-roll, 5" diameter Troughing Idlers for:

14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.88
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.80
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable pre-lubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1190.**

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Mfrs. of Scales, Conveyors, Conveyor Parts, Idlers, Vibrating Screens, Crushers and Feeders
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1½ Ton Spur Geared
20 Ft. Fall

Used - Guaranteed

$79.50

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Gasoline Fired

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Under chassis heater for car or truck. Road & other heavy equipment. Complete with fittings. 50,000 BTU. Other uses. Lightweight 10x12". 2 for $17.00. F.O.B. Kansas City, Missouri $9.50

PORTABLE STOVE

Will burn wood, coal, coke, garbage, leaves, etc. Weighs only 65 pounds. Guaranteed unconditionally to be the best heating buy direct from the U.S. Army. Over 100,000 BTU's.

FREE BONUS
6 lengths 4" stove pipe, Shovel, Poker, Shaker.

$7.95 EACH
In lots of 5 or more $7.00 ea.

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APRON FEEDER: Heavy duty 4 ft. x 14 ft. with 15 H.P. motor.

JAW CRUSHERS: 18 x 30, 36 x 42, 40 x 42, 48 x 60, 56 x 72", all steel, with or without motors and controls.

BALL MILLS: Two 7 ft. x 24 ft. with or without motors. Hardinge 8 x 36 and 8 x 48" Conical mills complete with 2200 volt motors.

KILNS: Two 8' x 125 ft.

HAMMER MILL: 350 tons per hour, 6 to 10" material down to 1¼" product.

AUTOCLAVES: Two 6'6" x 66 ft., 150 lbs. pressure.

CONVEYORS: One 36" and one 42" x 736 ft., complete with all equipment and supporting structure.

LOCOMOTIVES: One General Electric 25 ton and one 44 ton, standard gauge, diesel electric.

HOISTS: Lidgerwood single drum 7' dia., 5'7" face, 32,000 lbs. pull, 1¾" rope, 250 or 450 FPM, 150 or 250 H. P. One single drum Nordberg 5' dia., 5' face, 1⅛" rope, 100 H.P., 750 FPM. One Nordberg double clutched drum 10' x 10', 1½" rope, 1250 H.P., 1200 FPM. All the above with post brakes, Lilly controls, 2200 volt motors and controls. Other hoists 100 H.P. to 2500 H.P.

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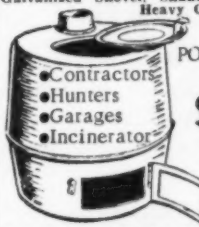

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1—Allis Chalmers 9' x 130' Rotary Kiln, ¾" shell.
1—Vulcan 8' x 87', ½" shell.
2—Vulcan 7' x 80', ½" shell.
2—Link Belt Roto Louvre Dryers, 6'4" x 24'.
1—Rennenberg 6' x 50', ⅜" shell.
1—Ruggles Cole 5' x 30', ⅜" shell.
1—Allis Chalmers 4' x 40'.
1—Allis Chalmers 4' x 30', ⅜" shell.
1—34" x 30', 5/16" shell.

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1—Denver 3' x 5' Continuous Ball Mill.
1—Telsmith Red. Crusher no. 46, 50 HP.
2—Kennedy #6 Gyratory Crushers, 50 HP.
5—Jaw Crushers 12" x 18" to 36" x 48".
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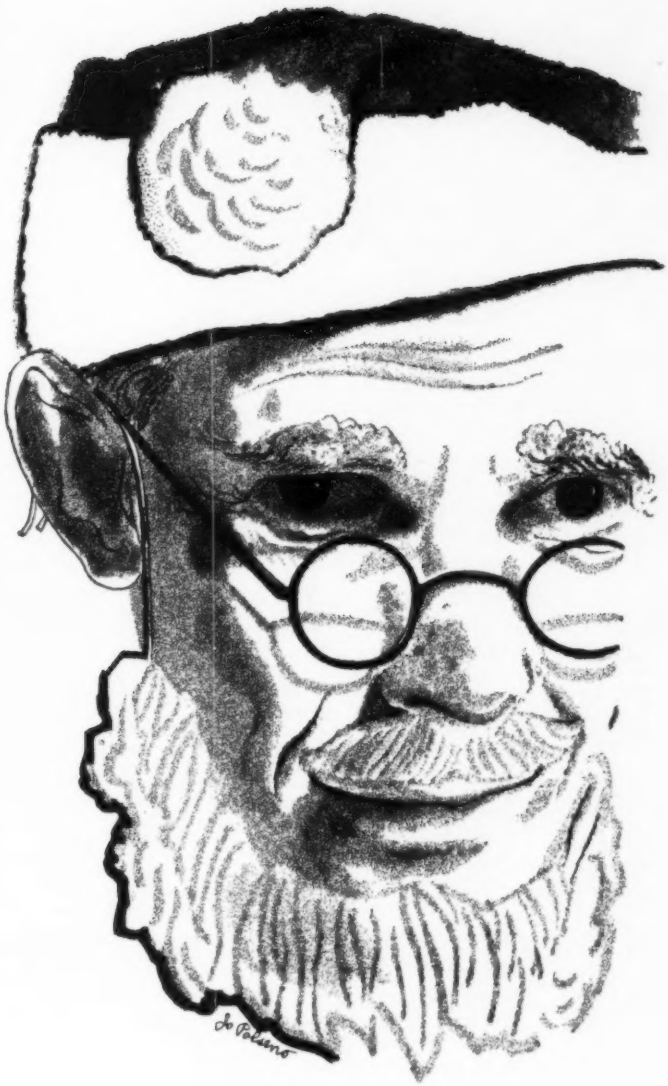
We took a sage suggestion from Santa



"This Christmas check is wonderful," our office Santa Claus told us last year while he was making up for the office party. "But you should have enclosed an application card for more U.S. Savings Bonds on our Payroll Savings Plan. The time to persuade me to *invest* money is when I *have* money."

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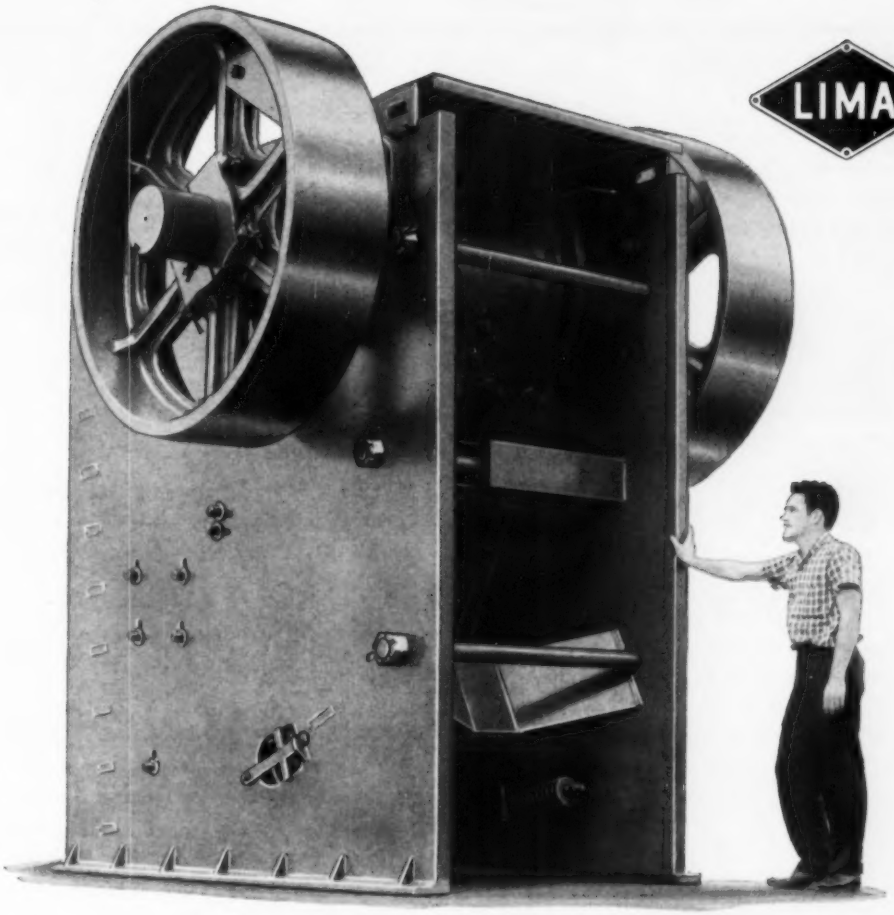

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main frame is practically unbreakable. Low alloy, high strength 3-in. steel plate gives frame tremendous strength in proportion to its weight.

flywheels are heavy castings, precision machined to proper balance. Split-type hubs simplify flywheel removal. Flywheels are key-locked into place, can't back off in operation.

pitman and shaft assembly can be easily removed through crusher frame top. Cartridge-type housing holds assembly in place, eliminates possibility of loose bearings.

bearings—Both main and pitman bearings are oversized and self-aligning to permit some shaft deflection, and deviation is minimized by locating the bearings close together. Frame absorbs part of shock load as main bearing center lines are within sides of main frame.

Bearings are protected by a simple-type steel labyrinth seal which resists entrance of dirt and seals in lubricant. Bearings may be easily removed by use of a hydraulic system furnished with this model.

capacity—What the Model 4248 can do for you may be seen from the fact that it handles 240-360 tons an hour when set at 5-in. discharge opening; estimate based on 2700 lb. per cu. yd.

Lima Austin-Western also produces a complete line of crushing and screening equipment and portable and stationary plants. Other smaller sizes of roller bearing Jaw Crushers are also available.

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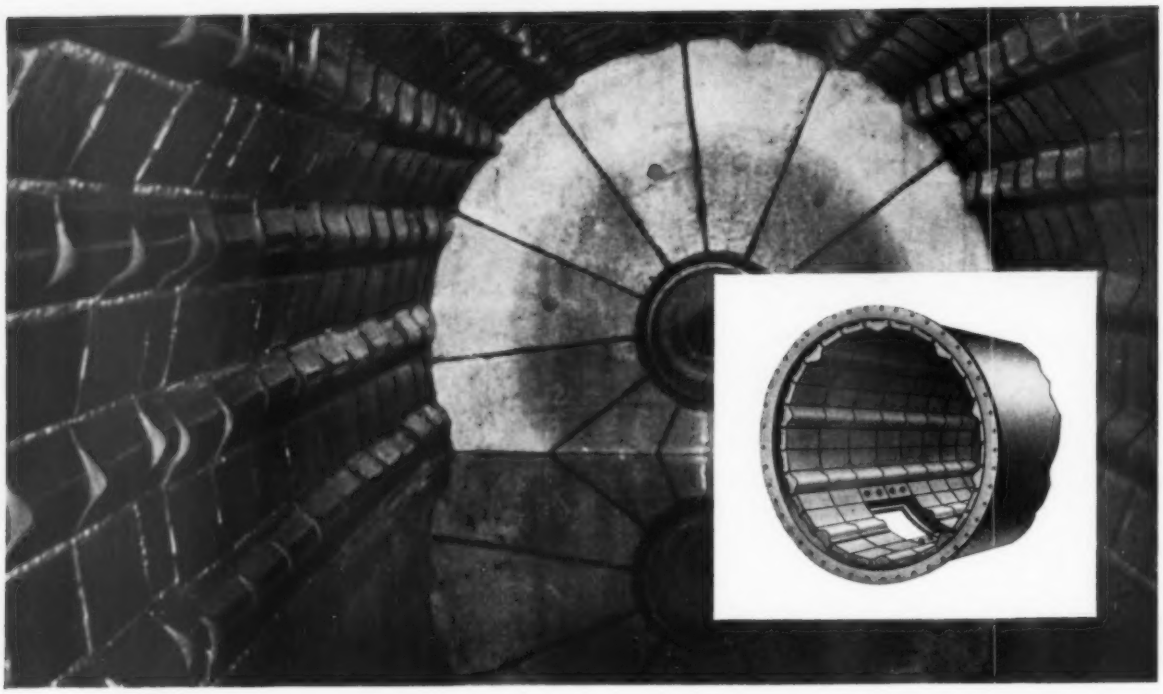

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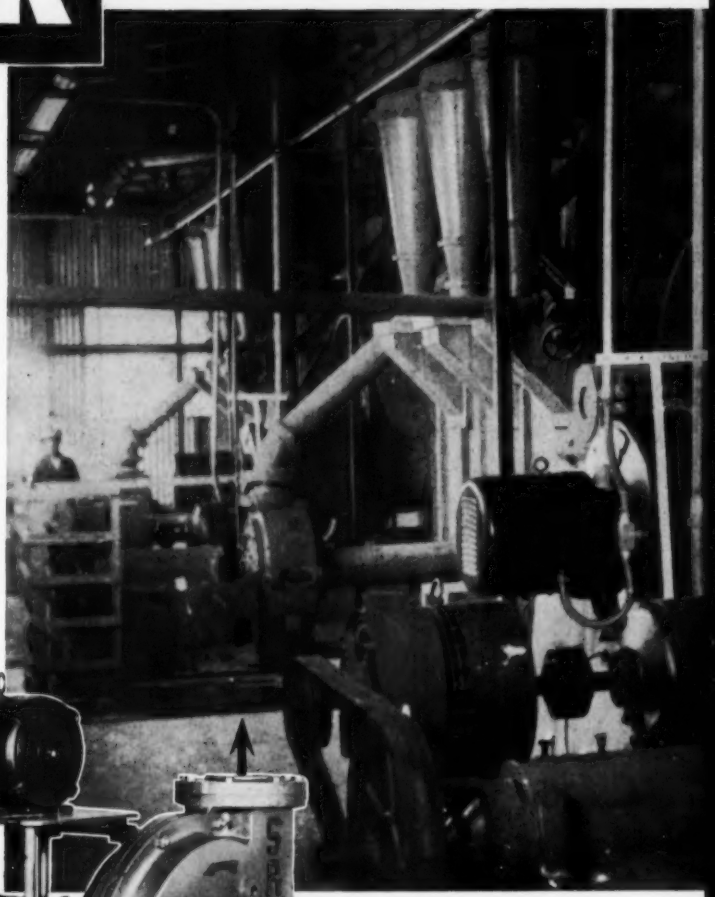

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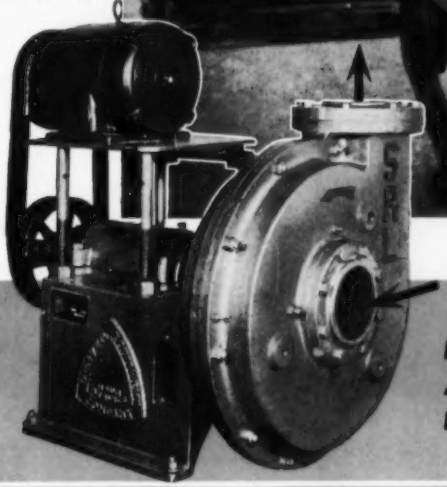

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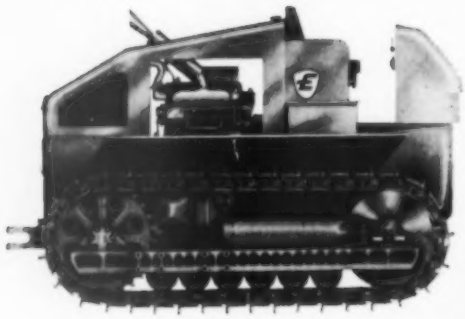

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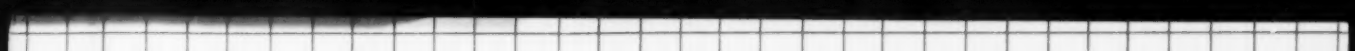
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